

From: Brown, Milly
To: [Kevin Penney](#); [Macleod-Boland, Alison](#)
Subject: Fw: Draft
Date: Tuesday, September 29, 2015 12:15:29 AM
Attachments: [New Format Draft Report August 2015 revised Sept 28 COMPARE FORMAT.docx](#)
[New Format Draft Report August 2015 revised Sept 28.docx](#)

One doc gives the changes and the other is the changed doc.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Khurana, Harman <HarmanKhurana@gov.nl.ca>
Sent: Tuesday, September 29, 2015 12:11 AM
To: Brown, Milly
Subject: RE: Draft

Milly,

Attached is the latest draft. One is clean copy, the other is Compare copy to the earlier version sent.

Craig

From: Brown, Milly
Sent: Monday, September 28, 2015 8:07 PM
To: Khurana, Harman
Subject: Fw: Draft

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Mullaley, Julia <JMullaley@gov.nl.ca>
Sent: Monday, September 28, 2015 12:34 PM
To: Brown, Milly
Subject: Draft

Milly,

Could you please forward the attached draft to Kevin and whoever else needs a copy to begin formatting. Ignore the red and highlighted fonts for conversion.

Thanks

Introduction



Muskrat Falls Site – Progress on Spillway and Powerhouse – August 2015

The Muskrat Falls Oversight Committee was established by the Government of Newfoundland and Labrador in March 2014 to strengthen the existing oversight of the Muskrat Falls Project (the Project). The Committee's mandate focuses on cost, schedule and risk management for the construction phase of the Project. Reports of the Committee can be located at <http://gov.nl.ca/mfoversight>.

The Committee's last report for the quarter ended March 2015 highlighted several risks to the Project budget and schedule including that two major contracts had not yet been awarded and schedule and cost pressures were being experienced, particularly with respect to the Powerhouse & Intake contract for the Muskrat Falls Generating Facility. During the ensuing period, the Committee has been closely monitoring these risks and receiving regular updates on the Project from Nalcor. Over this period, Nalcor has finalized costing of the two outstanding contracts referenced above: **increased allowance for maximum labour costs with respect to the Powerhouse & Intake contract;** **[NTD: NALCOR to review and offer alternative language]** and identified additional cost pressures, including labour and materials for access clearing based on experience gained in the field to date. As a result,

on September 22, 2015 [NTD: NALCOR, was this the date of Board meetings to approve all new Budget AFE's?], 2015 Nalcor revised the Project Budget from \$6.99 billion to \$7.65 billion¹.

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Project Costs

Committee Observations

- Project capital budget has increased from \$6.99 billion to \$7.65 billion.
- Incurred costs at August 2015: \$3.26 billion.
- Committed costs at August 2015: \$5.97 billion.
- Project Forecast Contingency budget at September 2015 has been revised to \$186.8 million. Risk remains for contract execution at the Muskrat Falls Generating Facility.

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Project Costs

Table 1 provides information on the allocation of the adjustment in the Project budget from \$6.99 billion to \$7.65 billion among the three sub-projects. This ~~Table~~ also includes incurred costs up to the end of August 2015, totaling \$3.3 billion². At the end of August 2015 the committed costs³ totaled \$5.97 billion.

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Table 1
Project Cost Change as of September 2015 & Incurred cost as of August 2015 (in \$ thousands)

¹ Total Project costs include construction costs of \$7.65 billion plus interest and other financing costs of \$1.34 billion that will be incurred during construction, for an estimated total of ~~\$8.959.05~~ billion.

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² Incurred Costs represents the total estimated cumulative value of all goods and services provided to the Project up to the point in time regardless of whether it was paid during the current period or will be paid at some future point in time.

³ Committed Costs: The estimated value of an obligation made by the Project for the provision of goods or services; represented by a Financial Commitment. Committed costs are captured when a Financial Commitment is made and its value is based upon the original estimate for that Financial Commitment. A Financial Commitment is a legal agreement between Nalcor Energy - Lower Churchill Project (NE-LCP) and a third party which authorizes NE-LCP to proceed with the award/instruction to the third party to provide goods and/or services for an agreed price or in accordance with an agreed pricing structure. The value of the Financial Commitment is represented by the cumulative value of the original amount and any approved variation orders to the contracts or change orders to the purchase order (which may or may not be a Project scope change).

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| Muskrat Fall Project | Project Budget | | Change | | Incurred Costs August 2015 |
|-----------------------------------|--------------------|--------------------|------------------|-------------|-------------------------------|
| | June 2014 | September 2015 | (\$) | (%) | |
| Muskrat Fall Generation Facility | \$3,371,988 | \$3,685,966 | \$313,978 | 9.3% | \$1,726,356 |
| Labrador-Island Transmission Link | \$2,786,481 | \$3,089,378 | \$302,897 | 10.9% | \$1,046,647 |
| Labrador Transmission Assets | \$831,945 | \$877,557 | \$45,612 | 5.5% | \$488,277 |
| Total Project | \$6,990,414 | \$7,652,901 | \$662,487 | 9.5% | \$3,261,280 |

Table 2 provides additional information on the revised Project Budget by expenditure category for each of the sub-projects.

NTD: NALCOR Please confirm that there is no change to the \$1.3 billion finance costs noted in footer #1

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Table 2
Project Cost Change by Sub-Project as of September 2015 (in \$ thousands)

| Muskrat Fall Generation Facility | Project Budget | | Change | |
|---|--------------------|--------------------|------------------|--------------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$382,811 | \$408,723 | \$25,912 | 6.8% |
| Feasibility Engineering | \$17,949 | \$17,949 | (\$0) | 0.0% |
| Environment & Regulatory Compliance | \$24,312 | \$25,825 | \$1,513 | 6.2% |
| Aboriginal Affairs | \$13,314 | \$13,314 | \$0 | 0.0% |
| Procurement and Construction | \$2,786,766 | \$3,121,813 | \$335,047 | 12.0% |
| Commercial & Legal | \$25,989 | \$25,239 | (\$750) | -2.9% |
| Contingency | \$120,847 | \$73,102 | (\$47,745) | -39.5% |
| Total MFGen | \$3,371,988 | \$3,685,966 | \$313,978 | 9.3% |
| Labrador-Island Transmission Link | Project Budget | | Change | |
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$225,814 | \$221,293 | (\$4,521) | -2.0% |
| Feasibility Engineering | \$21,252 | \$21,252 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$22,306 | \$14,446 | (\$7,860) | -35.2% |
| Aboriginal Affairs | \$2,244 | \$2,684 | \$440 | 19.6% |
| Procurement and Construction | \$2,426,095 | \$2,717,326 | \$291,231 | 12.0% |
| Commercial & Legal | \$16,490 | \$16,490 | \$0 | 0.0% |
| Contingency | \$72,280 | \$95,887 | \$23,607 | 32.7% |
| Total LIL | \$2,786,481 | \$3,089,378 | \$302,897 | 10.9% |
| Labrador Transmission Assets | Project Budget | | Change | |
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$99,973 | \$144,958 | \$44,985 | 45.0% |
| Feasibility Engineering | \$220 | \$220 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$710 | \$811 | \$101 | 14.3% |
| Aboriginal Affairs | \$188 | \$188 | \$0 | 0.2% |
| Procurement and Construction | \$696,322 | \$709,643 | \$13,321 | 1.9% |
| Commercial & Legal | \$3,141 | \$3,891 | \$750 | 23.9% |
| Contingency | \$31,391 | \$17,846 | (\$13,545) | -43.2% |
| Total LTA | \$831,945 | \$877,557 | \$45,612 | 5.5% |
| Total Project | \$6,990,414 | \$7,652,901 | \$662,487 | 9.5% |

Additional details of the cost increase for the revised budget by Sub-Project are provided below:

I. Muskrat Falls Generation Facility

Total budgeted costs for the Muskrat Falls Generation Facility have increased from \$3.37 billion to \$3.69 billion, a difference of \$314 million or 9.3 per cent from the June 2014 budget. This cost increase is primarily attributable to the finalization of major outstanding contracts and contractor performance.

Table 3
Muskrat Fall Generation Facility – Revised Project as of September 2015 (in \$ thousands)

| Muskrat Fall Generation Facility | Project Budget | | Change | |
|---|--------------------|--------------------|------------------|-------------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$382,811 | \$408,723 | \$25,912 | 6.8% |
| Feasibility Engineering | \$17,949 | \$17,949 | (\$0) | 0.0% |
| Environment & Regulatory Compliance | \$24,312 | \$25,825 | \$1,513 | 6.2% |
| Aboriginal Affairs | \$13,314 | \$13,314 | \$0 | 0.0% |
| Procurement and Construction | \$2,786,766 | \$3,121,813 | \$335,047 | 12.0% |
| Commercial & Legal | \$25,989 | \$25,239 | (\$750) | -2.9% |
| Contingency | \$120,847 | \$73,102 | (\$47,745) | -39.5% |
| Total MFGen | \$3,371,988 | \$3,685,966 | \$313,978 | 9.3% |

1. Finalization of Major Outstanding Contracts

In earlier reports, the Committee noted it was monitoring the progress of three major contracts to be awarded for the Muskrat Falls Generating Facility as this was identified as a risk to the contingency budget. These three contracts were valued at approximately five ~~(5)~~ per cent of the total June 2014 Project Budget. In its December Report, the Committee noted that the contract for the North Spur Stabilization Works was awarded at a higher value than originally budgeted. Since March 2015, one of the two remaining contracts - the construction of the North and South Dams ~~(CH0009)~~ was finalized and similarly resulted in those contract costs being significantly higher than original budget. Nalcor indicates that this cost escalation is reflective of increased market pressures and will also apply to the remaining contract, the supply and installation of the Mechanical and Electrical auxiliaries, which is still under review. The cost increases associated with these two major contracts and ~~Nalcor's expectation on the remaining the third~~ contract is reflected in the increase in the budget for Procurement and Construction category in Table 3 above.

2. Contractor Performance on the Muskrat Falls Generation Facility

In its March 2015 Report, the Committee noted continued slippage in schedule progress at the Muskrat Falls Generating Facility, specifically the **Powerhouse & Intake**. The Committee observed an increase in risk levels associated with contractor performance; ~~Powerhouse~~ concrete placement rates; and readiness for ~~River Diversion~~ river diversion in 2016. Nalcor continues to work with the contractor to implement the ~~recovery~~ mitigation plan which involves ramping up labor and production in an effort to get back on schedule. The additional efforts at the Muskrat Falls Generation Facility are inducing additional cost pressures on the project. ~~While the contractual agreement between Nalcor and the civil contractors contains provision to reduce Nalcor's exposure to project cost increases related to contractor performance, Nalcor has increased the Project budget to account for the maximum allowable labour compensation payable to the contractor under the contract [NTD: NALCOR to review and offer alternative language].~~ This additional cost is reflected in the increase in the budget for Procurement and Construction above ~~Nalcor does have a provision in the contract with the main civil contractor to mitigate exposure to labour cost increases.~~

In addition, to ensure continued ~~productivity~~ production improvements and minimize risk of further schedule slippage, Nalcor has increased the budget for ~~project oversight by deploying~~ additional project management resources ~~as well as related overhead costs associated with~~ and centralized camp services for both contractor and project management personnel. This is expected to increase project management costs under the category NE-LCP Owners Team, Admin and EPCM Services above.

II. Labrador Island Transmission Link

Total budgeted costs for the Labrador Island Transmission Link have increased from \$2.79 billion to \$3.09 billion, a difference of \$302.9 million or 10.9 per cent.

Table 4
Labrador Island Transmission Link – Revised Project as of September 2015 (in \$ thousands)

| Labrador-Island Transmission Link | Project Budget | | Change | |
|---|--------------------|--------------------|------------------|--------------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$225,814 | \$221,293 | (\$4,521) | -2.0% |
| Feasibility Engineering | \$21,252 | \$21,252 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$22,306 | \$14,446 | (\$7,860) | -35.2% |
| Aboriginal Affairs | \$2,244 | \$2,684 | \$440 | 19.6% |
| Procurement and Construction | \$2,426,095 | \$2,717,326 | \$291,231 | 12.0% |
| Commercial & Legal | \$16,490 | \$16,490 | \$0 | 0.0% |
| Contingency | \$72,280 | \$95,887 | \$23,607 | 32.7% |
| Total LIL | \$2,786,481 | \$3,089,378 | \$302,897 | 10.9% |

In previous reports, the Committee noted that there had been drawdowns on contingency for changes relating to steel towers, foundation types, and additional materials required for the Labrador-Island Transmission Link. Nalcor reports that as work progressed for clearing right-of-way access roads, the geotechnical conditions ~~(sub surface conditions and materials)~~ encountered, particularly in Central Labrador, were significantly more challenging than originally anticipated. Based on experience to date and recent in-depth field experience of the ground conditions, Nalcor has confirmed that additional labour and materials will be required to complete this work. As contracts for this work are time and material contracts, an increase in labour and materials will directly result in an increase in contract costs. Harsher than normal winter conditions has also impacted labour productivity, resulting in projected additional labour hours to complete the work.

In addition, given the geotechnical conditions encountered, Nalcor has enhanced the tower and foundation design in certain areas to ensure reliability of this infrastructure. This change in design, combined with investments towards road infrastructure (including bridges and culverts) to improve year around access reliability in remote areas, will also increase anticipated costs.

A change in foreign exchange rates has also resulted in an increase in contract costs for the contract for the Switchyard, Converter and Synchronous condensers by \$20M. Nalcor ~~has advised~~ advises that the impact of the reduction in the value of the Canadian dollar has, ~~from an overall project,~~ been largely avoided ~~as most.~~ Although significant purchases are being made outside Canada, many of these contracts were issued either priced in Canadian dollars ~~[NTD: NALCOR understand this from discussions. Please confirm statement].~~ at the date of execution, or the goods were delivered and payments made prior to the devaluation of the Canadian dollar.

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The anticipated cost escalation as outlined above is reflected in the increase in the budget for Procurement and Construction and Contingency categories in Table 4.

III. Labrador Transmission Assets

Total budgeted costs for the Labrador Transmission Assets have increased from \$831.95 million to \$877.56 million, a difference of \$45.6 million or 5.5 per cent.

Table 5
Labrador Transmission Assets – Revised Project as of September 2015 (in \$ thousands)

| Labrador Transmission Assets | Project Budget | | Change | |
|---|------------------|------------------|-----------------|-------------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$99,973 | \$144,958 | \$44,985 | 45.0% |
| Feasibility Engineering | \$220 | \$220 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$710 | \$811 | \$101 | 14.3% |
| Aboriginal Affairs | \$188 | \$188 | \$0 | 0.2% |
| Procurement and Construction | \$696,322 | \$709,643 | \$13,321 | 1.9% |
| Commercial & Legal | \$3,141 | \$3,891 | \$750 | 23.9% |
| Contingency | \$31,391 | \$17,846 | (\$13,545) | -43.2% |
| Total LTA | \$831,945 | \$877,557 | \$45,612 | 5.5% |

In previous reports, the Committee noted that there had been drawdowns on contingency for changes relating to additional foundations and mechanical rock anchors for the transmission line and backfill required for the foundations of some transmission towers for the Labrador Transmission Assets.

Although to a much lesser degree than noted above for the Labrador-Island Transmission Link, the geotechnical conditions encountered for the Labrador Transmission Assets were more challenging than originally anticipated. As a result, Nalcor has indicated that additional labour and materials will be required to complete this work. Recommended design changes to the AC Line and switchyard layout at Muskrat Falls and Churchill Falls to respond to geotechnical conditions will also result in increased costs. Harsher than normal winter conditions ~~hashave~~ also impacted labour productivity resulting in projected additional labour hours to complete the work. The anticipated cost pressures as outlined above are reflected in the increase in the budget for Procurement and Construction category in Table 5.

In addition, as reflected in Table 5, Nalcor has increased project management resources for the Labrador Transmission Assets to increase the focus on safety and mitigate risks associated with the time and material contracts for the Right of Way activities. ~~[INTD: NALCOR, please review language to ensure accuracy of statement]~~ This is expected to increase project management costs under the category NE-LCP Owners Team, Admin and EPCM Services.

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Additional information on the revised Project Budget can be found at: ~~(include Link to Nalcor on Nalcor's website)~~.

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Project Schedule Performance

In this section, the Committee provides information on actual schedule progress compared to planned schedule progress for the period ended August 2015. Readers are cautioned that Nalcor is currently establishing new baselines for the Project schedule and that the planned progress reference measures will change when the new baseline is complete. The progress measures ~~are~~ provided here ~~as~~ are in reference to ~~general progress on~~ the original planned schedule to August 2015.

Committee Observations

- Schedule pressures continue to be experienced at the Muskrat Falls Generating Facility's Powerhouse and Intake.
 - Critical Path for River Diversion in 2016 remains on track.
 - Risk of schedule delays remains high due to powerhouse concrete placement.
 - Critical Path to first power for December 2017 is under review.
 - Project Milestone Dates for Muskrat Falls Generating Facility are currently under review.

At August 2015

- Actual Construction Progress 33.5 per cent. Planned Progress 43.3 per cent. Variance of 9.8 per cent behind schedule.
 - Progress on the Muskrat Falls Generating Facility continues to track slower than planned.
 - Schedule progress is 23.4 per cent behind plan for the Powerhouse and Intake.
 - Schedule has been corrected on the Spillway and Gates and is currently 3.4 per cent ahead of plan.
 - Mitigation actions continue to be implemented.
 - Progress on the Labrador-Island Transmission Link is tracking 6.3 per cent behind plan.
 - Schedule variance relate primarily to progress on the transmission line installation.
 - Progress on the Labrador Transmission Assets is tracking 5.3 per cent behind plan.
 - Schedule variance relates primarily to work at switchyards.

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Muskrat Falls Project

This section provides an overview of the planned schedule to August 2015, first on an overall Project basis, and then by each of the sub-projects.

Schedule

Nalcor monitors and reports schedule progress on all activities, both construction and manufacturing. Construction activities include all those activities occurring at site locations in the province. Manufacturing activities include those supply/install contracts that take place outside the province (e.g. the generators are being manufactured in China).

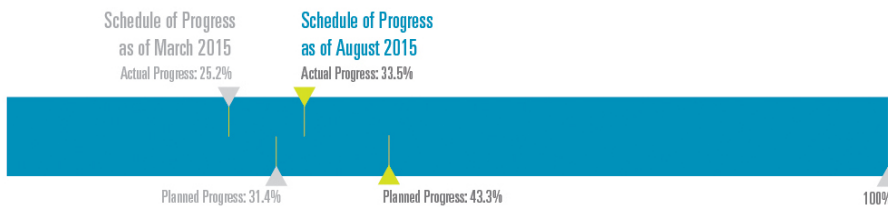
1- Construction Activities

Construction activities are mainly monitored and reported on an ongoing installation/construction progress basis, while manufacturing activities are generally monitored and reported based on a Milestone and/or delivery date basis.

2- Construction Activities

Construction has continued to advance on the Muskrat Falls Project since March 2015. As outlined in Figure 2 and detailed in Table 6, overall Project schedule progress at the end of August 2015 is 33.5 per cent as compared to a planned schedule progress of 43.3 per cent, a variance of 9.8 per cent lower than planned [March 2015 Report variance was 6.2 per cent lower than planned].

Figure 2
Muskrat Falls Project – Schedule of Progress at August 2015
(including March 2015 comparison)



Schedule progress is distributed among the three sub-projects as outlined below. Progress variance continues to relate primarily to the Muskrat Falls Generating Facility which

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continues to track behind schedule; however, slippage has despite a narrowed slightly slippage, between June 2015 and August 2015. continues to track behind schedule. Since March 2015, there has been increased slippage on both the Labrador-Island Transmission Link and the Labrador Transmission Assets sub-projects. Further information regarding the progress schedule is provided in the section below by sub-project.

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Table 6
Planned Construction Schedule Progress vs. Actual Schedule Progress – August 2015

| Muskrat Falls Project: Sub-Project | Planned Schedule Progress – August 2015 | Actual Schedule Progress – August 2015 | Variance August 2015 | Variance June 2015 | Variance March 2015 |
|------------------------------------|---|--|----------------------|--------------------|---------------------|
| Muskrat Falls Generating Facility | 48.8% | 34.8% | -14.0% | -14.3% | -11.7% |
| Labrador-Island Transmission Link | 33.4% | 27.1% | -6.3% | -5.5% | -1.4% |
| Labrador Transmission Assets | 57.1% | 51.8% | -5.3% | -2.1% | 1.0% |
| Total | 43.3% | 33.5% | -9.8% | -9.3% | -6.2% |

Sub-Project: Muskrat Falls Generating Facility

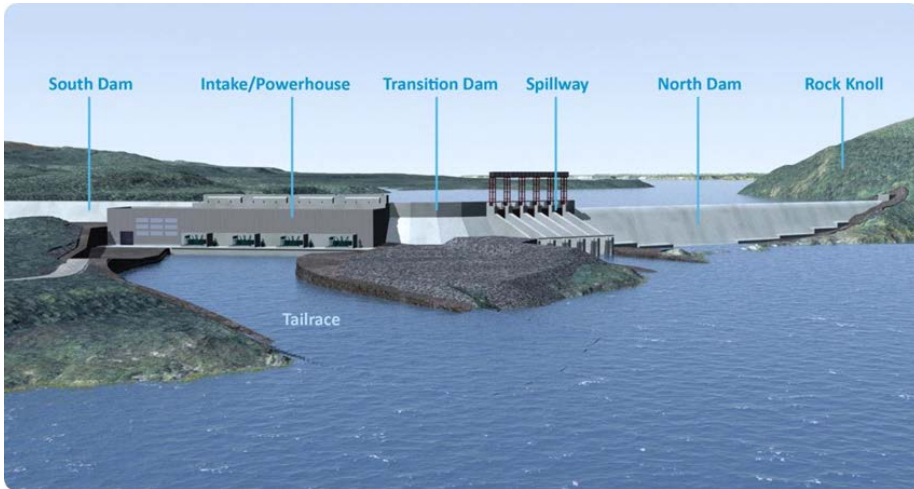
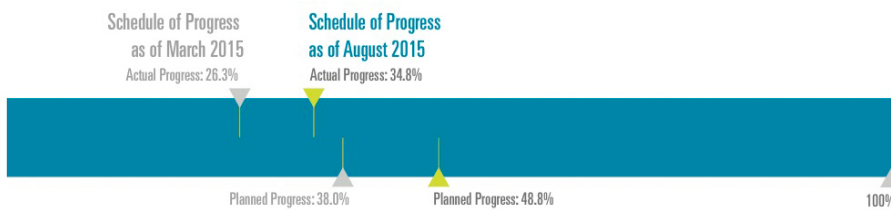


Figure showing the Muskrat Falls Generating Facility

Schedule

As of the end of August 2015, the actual construction progress for the generating facility was 34.8 per cent complete compared to a planned progress of 48.8 per cent complete, a variance of 14.0 per cent behind the planned schedule [March 2015 Report variance was 11.7 per cent behind the planned schedule].

Figure 4
Muskrat Falls Generating Facility – Schedule of Progress at August 2015
(including March 2015 comparison)



This schedule variance is mainly attributable to three activities within the generating facility sub-project:

- North Spur Stabilization;
- Powerhouse & Intake; and

o Reservoir Preparation-

The progress status of each of these activities is summarized in Table 7 below as follows:

Table 7
 August 2015 - Construction Activity for the Muskrat Falls Generating Facility
 - Planned Progress vs. Actual Progress

| Construction Activity | August 2015 Cumulative % | | | June 2015 Variance | March 2015 Variance |
|--------------------------|--------------------------|----------|--------------|--------------------|---------------------|
| | Planned | Actual | Variance | | |
| <i>Activity</i> | <i>A</i> | <i>B</i> | <i>B - A</i> | <i>C</i> | |
| North Spur Stabilization | 41.6% | 16.6% | -25.0% | -25.8% | -21.2% |
| Powerhouse & Intake | 41.9% | 18.5% | -23.4% | -22.9% | -18.3% |
| Reservoir Preparation | 71.5% | 60.8% | -10.7% | -6.2% | 0.6% |

North Spur Stabilization

As outlined in the Committee’s September 2014 report, the planned date for the North Spur Works Ready for Diversion Milestone was revised from November 2015 to September 2016. Nalcor advises that the slippage recorded in the current schedule with respect to the North Spur Stabilization Works, is not reflective of the revised plan date for this work activity. As a result, as noted in previous reports, Nalcor advises that the progress will continue to track behind current plan for this scope of work until a new baseline of the work schedule is set based on this revised execution strategy. This re-baselining of the schedule for the North Spur Stabilization Works is ~~expecting~~ expected to be completed by XXX [NTD: NALCOR this has been explanation for several reports. Can we provide approximate timeframe when will be re baselined], in November 2015. Nalcor advises that stabilization work is progressing well at the North Spur and the geotechnical conditions encountered to date, are as expected.

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Muskrat Falls Site – Progress on North Spur – August 2015

Powerhouse & Intake

The progress on the **Powerhouse & Intake** continues to fall behind against the original contractor’s schedule. As of the end of August 2015, the actual construction progress for the Reservoir Preparation was 18.5 per cent complete compared to a planned progress of 41.9 per cent complete, a variance of 23.4 per cent behind the planned schedule [the March 2015 variance was 18.3 per cent behind planned schedule].

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Nalcor advises they are working diligently with the civil contractor to improve concrete placement rates and achieve increased and sustained production rates during each season. The Project’s critical path required that priority be placed on the Spillway and Gates in order to achieve river diversion in 2016. As a result, resources were concentrated on these activities which caused some further schedule slippage on the Powerhouse and Intake. There are ongoing discussions with the civil contractor to determine timelines for the completion of the remaining work in the Powerhouse and Intakes.

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The Committee notes that the Integrated Project Schedule indicates that the tracking milestone on the critical path to first power for December 2017 has been removed pending Nalcor’s current review of the Project Milestone Dates for the Muskrat Falls Generating Facility.

The Independent Engineer states in the recent site visit report that “... fully meeting the current overall schedule for the powerhouse and intakes will be a significant challenge, not impossible, but likely not probable.”



Progress on the Powerhouse at the Muskrat Falls Site – August 2015

Reservoir Preparation

The Committee has observed a notable change in the progress on the Reservoir Preparation since the March 2015 report. As of the end of August 2015, the actual construction progress for the Reservoir Preparation was 60.8 per cent complete compared to a planned progress of 71.5 per cent complete, a variance of 10.7 per cent behind the planned schedule [the March 2015 variance was 0.6 per cent ahead of the planned schedule]. ~~Nalcor advises that~~ Nalcor indicates that there is considerable float in the reservoir preparation work, it is not on the critical path and will not impact river diversion. As a result, the contractor resources have been reassigned to the clearing work on the Labrador Island Transmission Link which has is closer to a higher priority at this time [NTD: NALCOR, why is this work on LITL a higher Priority]-critical path milestone. The current forecast date for the reservoir clearing is under review. ~~Nalcor indicates that there is considerable float in the reservoir preparation work, is not on the critical path and will not impact river diversion.~~

Spillway and Gates

The Committee notes that for the period April to August 2015, considerable progress has been reported for the Spillway and Gates sub-project. As of the end of August 2015, the actual construction progress for the Spillway and Gates was 58.0 per cent complete compared to a planned progress of 54.6 per cent complete, a variance of 3.4 per cent ahead of the planned schedule [March 2015 Report variance was 9.0 per cent behind the planned schedule]. Nalcor has advised that Spillway concrete work will be significantly complete in 2015 and is on target to achieve River Diversion in 2016. ~~[NTD: NALCOR to CONFIRM].~~

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The Committee posed the following questions to Nalcor:

~~1. Does the continued schedule slippage on the Powerhouse & Intake jeopardize the Critical Path and Milestone dates?~~

~~Nalcor advises that River Diversion in 2016 is the next activity on the critical path. This milestone requires the North Spur work to be complete in order to impound the reservoir to the 25 metre water level, and this work is proceeding well. As well, the Spillway concrete works and mechanical outfitting have to be advanced enough to be able to control the gates and this work is also on target. Finally the river closure work has to be sufficiently advanced to cut off the natural flow path of the river, which is also on target for 2016.~~

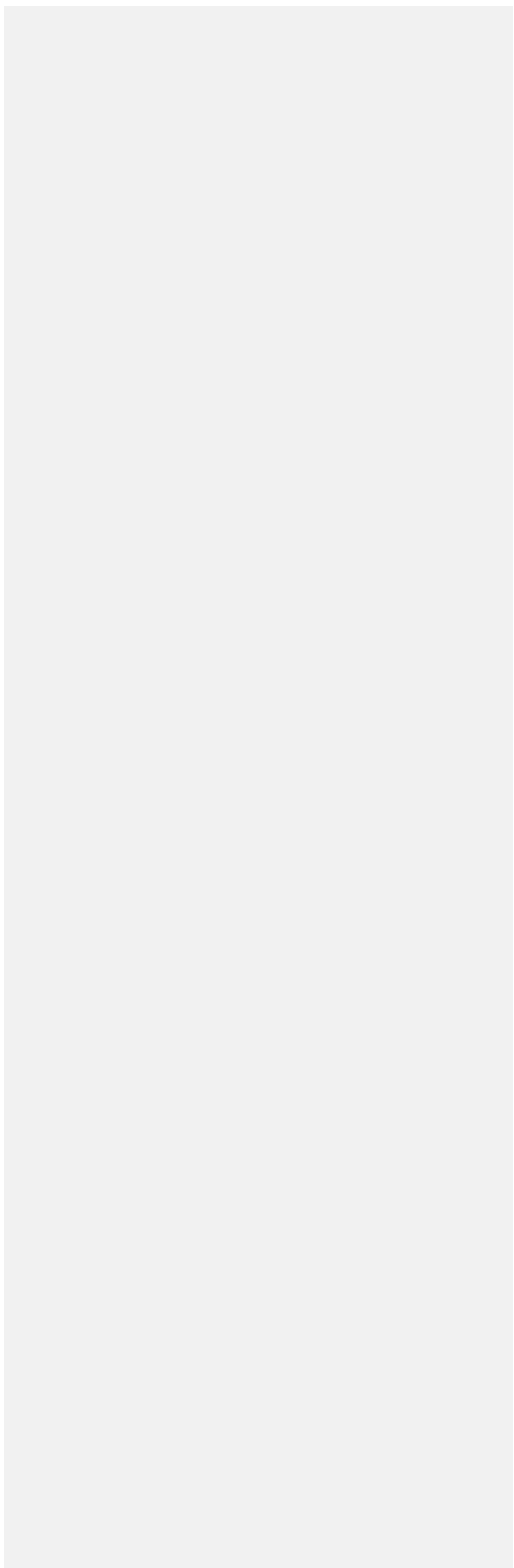
~~As demonstrated with the Spillway, schedule slippage can be recovered. The Spillway is now 3.4 per cent ahead of plan when in March the Spillway was 9.0 per cent behind plan. Nalcor advises that it is naturally concerned about the schedule of the Powerhouse and Intake and is working closely with the Contractor to develop schedule mitigation measures, such as applying the Canadian Standards Association revised standard regarding concrete curing times and the use of prefabricated concrete sections in the intakes.~~

~~2. Are the production improvements at the Muskrat Generating Facility, including target concrete placement rates, sustainable to maintain critical path and Milestone dates?~~

~~Nalcor responded that as described above, the next activity on the critical path is the River Diversion in 2016. Because of the major turnaround in concrete placement rates brought about by the efforts of Nalcor and the civil contractor, this milestone is back on target. The schedule delay to that Milestone which was reported in March 2015 has been recovered.~~

~~Nalcor advises that the Powerhouse and Intakes will now be subject to the same schedule mitigation, production improvements and efforts that were applied to the Spillway. The Milestone Dates relating to the Muskrat Falls Generating Facility remain under review.~~

|



Sub-Project: Labrador-Island Transmission Link

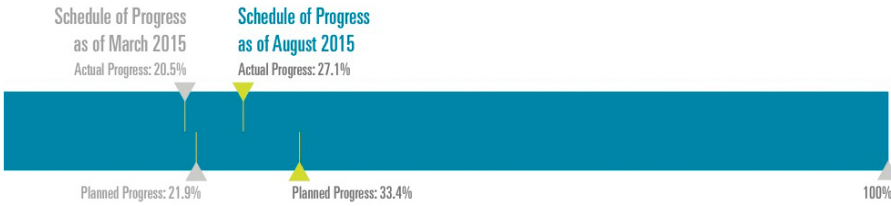


Figure showing the route for the Labrador-Island Transmission Link by Segment

Schedule

As of August 2015, the actual construction progress for the Labrador-Island Transmission Link was 27.1 per cent compared to a planned progress of 33.4 per cent complete, a variance of 6.4 per cent behind planned schedule [March 2015 Report variance was 1.4 per cent behind planned schedule].

Figure 6
Labrador-Island Transmission Link – Schedule of Progress at August 2015
(including March 2015 comparison)



Nalcor advised that the increased slippage in schedule performance is mainly due to challenging geotechnical conditions being experienced, particularly in Central Labrador. **The Spring affecting clearing, access, and tower foundations works. The spring** thaw also caused severe conditions at the work sites, resulting in the temporary lay-off of employees while awaiting improvement. There was also some lost production following the Quebec Innu protest and blockade. **[NTD: NALCOR, please review language]**

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Progress on the HVdc Transmission Line (Labrador-Island Transmission Link) – August 2015

Sub-Project: Labrador Transmission Assets

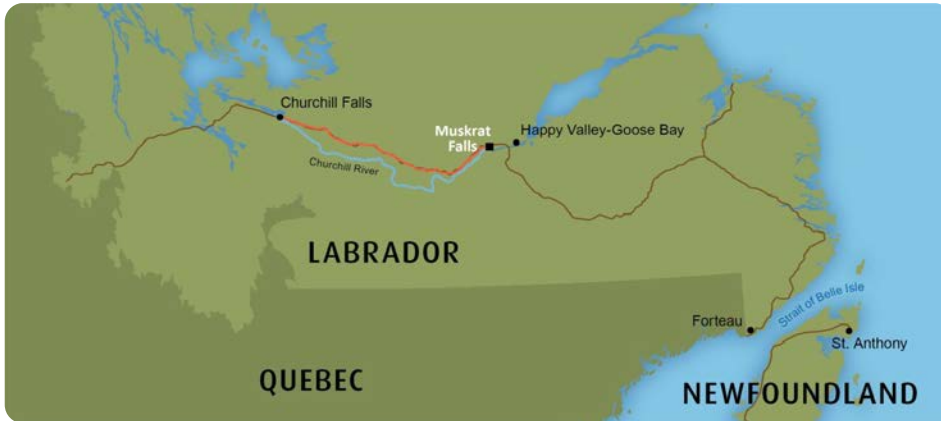
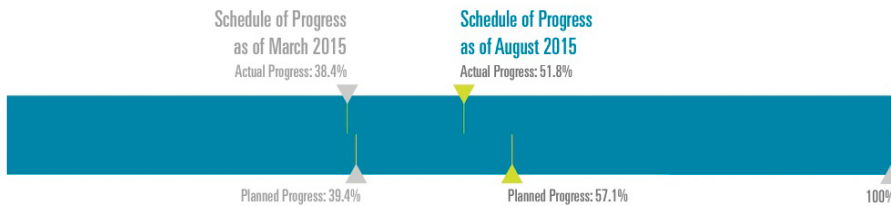


Figure showing the route for the transmission line for the Labrador Transmission Assets

Schedule

As of the end of August 2015, the actual construction progress for the Labrador Transmission Assets was 51.8 per cent complete as compared to a planned progress of 57.1 per cent complete, a variance of 5.3 per cent behind planned schedule [March 2015 Report variance was 1.0 per cent behind planned schedule].

Figure 8
Labrador Transmission Assets – Schedule of Progress at August 2015
(including March 2015 comparison)



Nalcor advised that there was some slippage in schedule performance, due to the geotechnical conditions being experienced encountered at the switchyards in at both Churchill Falls and at Muskrat Falls. [NTD: NALCOR, please confirm statement] which required design modifications and delayed start of civil work. The temporary layoff during the spring thaw also affected progress on the LTA. However, all work here is expected to catch up to forecast.

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Progress on the HVac Transmission Line (Labrador Transmission Assets) – August 2015

3. Manufacturing Activities

The six material manufacturing supply and install contracts awarded to date are as follows:

- Turbines and Generators; ~~(CH0030)~~
- Powerhouse Hydro-Mechanical Equipment; ~~(CH0032 – June 2015)~~
- HVdc Convertors and Transition Compounds; ~~(CD0501)~~
- Submarine Cable for the Strait of Belle Isle crossing; ~~(LC-SB-003 – August 2015)~~
- AC substations; and, ~~(CD0502)~~
- Synchronous Condensers for the Soldiers Pond Switchyard ~~(CD0534 – June 2015).~~

A summary of progress on these manufacturing activities as of the most recent Manufacturing report available ~~is as follows:~~

The **Turbine and Generators** contract continues to track behind the original contract schedule based on ~~the July 2015~~ contractor report – 35.39 per cent ~~(June 33.60 per cent)~~ complete as compared to a planned progress of ~~45.29~~~~48.59~~ per cent, representing a ~~slight increase in variance from the previous quarter (11.69 of 13.2 per cent in June 2015 vs. (10.01 per cent in March 2015).~~ Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery dates. In its Draw Certificate ~~for the period ending June~~~~dated August 27,~~ 2015, the Independent Engineer continues to note that there is considerable float between the site need date in the Integrated Project Schedule and the contract schedule, and that there is currently no cause for concern-; however, the Project team is monitoring manufacturing delivery dates to ensure that the site-need dates are not compromised.

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The contractor's report for the **Powerhouse Hydro-Mechanical Equipment** for the month of June 2015 indicates the project progress is at 24.67 per cent complete as compared to a planned progress of 39.12 per cent. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery.

The contractor's report for the **HVdc Convertors and Transition Compounds** for the month of June 2015 was not available for Committee review. Nalcor has advised that the reports from the contractor have not been accepted by Nalcor and have been returned to the contractor for revisions. [NTD: NALCOR, please confirm language]. May 2015 indicates that actual project progress is 12.1 per cent against a baseline planned progress of 18.9 per cent. The report indicates that part of this slippage is due to the re-aligning of the engineering phase, with the priority given to the Civil Works deliverables and procurement. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery.

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For the quarter period ended August 2015, the **Submarine Cable for the Strait of Belle Isle** crossing continues to track on its tracking slightly behind schedule with a cumulative progress of 53.74 per cent (June 49.36 per cent) complete as compared to a planned progress of 57.66 per cent (June 50.56 per cent).

The contractor's report for the **AC Substations** for April/May 2015 indicates that overall progress is ahead of the base line schedule by 1.70.3 percent with actual progress of 10.912.1 per cent complete compared to a planned progress of 9.211.8 per cent. [NTD: Quote from IE. HARMAN Need to confirm status of contractor. The report for CH0502. Is this notes that despite delays in dataroom or if not, obtain from NALCOR to confirm % engineering progress. the overall progress of the project exceeds the planned progress due to the progress made in procurement.

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The contractor's report for the **Synchronous Condensers** for the month of June 2015 indicates the project progress is at 15.8 per cent complete as compared to a planned progress of 27.2 per cent. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery. [NTD: NALCOR According to Notwithstanding, the report, the project is behind schedule due to delays experienced in the piling works being carried out by the subcontractor. The contractor is studying this impact the issues that have potentially caused the delay and is organizing a Planning Workshop workshop with the subcontractor their subcontractors and Nalcor to troubleshoot this issue and come up with an accelerated devise work plan plans to recover lost correct any schedule. Please confirm comment in yellow highlight above NTD?]

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Long-term Schedule

Nalcor is currently establishing new baselines for the Project schedule; therefore, as outlined in Table 8, the majority of the Milestone Dates have either been revised or are currently under review.

Table 8
Milestone Schedule

| Muskrat Falls Generating Facility | Planned Date March 2015 | Actual/Forecast August 2015 | Status |
|--|----------------------------|--------------------------------|--|
| Project Sanction | December 2012 | December 2012 | Complete |
| North Spur Works Ready for Diversion | September 2016 | September 2016 | Under review Formatted: Not Highlight |
| River Diversion Complete | November 2016 | November 2016 | Under review Formatted: Not Highlight |
| Reservoir Impoundment Complete | November 2017 | November 2017 | Under review Formatted: Not Highlight |
| Powerhouse Unit 1 Commissioned - Ready for Operation | December 2017 | December 2017 | Under review Formatted: Not Highlight |
| First Power from Muskrat Falls | December 2017 | December 2017 | Under review Formatted: Not Highlight |
| Powerhouse Unit 2 Commissioned - Ready for Operation | February 2018 | February 2018 | Under review Formatted: Not Highlight |
| Powerhouse Unit 3 Commissioned - Ready for Operation | April 2018 | April 2018 | Under review Formatted: Not Highlight |
| Powerhouse Unit 4 Commissioned - Ready for Operation | May 2018 | May 2018 | Under review Formatted: Not Highlight |
| Full Power from Muskrat Falls | May 2018 | May 2018 | Under review Formatted: Not Highlight |
| Commissioning Complete - Commissioning Certificate Issued | June 2018 | June 2018 | Under review Formatted: Not Highlight |
| Labrador-Island Transmission Link | Planned Date March 2015 | Actual/Forecast August 2015 | Status |
| Project Sanction | December 2012 | December 2012 | Complete |
| SOBI Cable Systems Ready | October 2016 | October 2016 | No change |
| MF Switchyard and Converter Station Ready for Operation | February 2017 | July 2017 | Revised |
| HVdc Transmission Line Construction Complete and Connected | June 2017 | July 2017 | Revised |
| Soldier's Pond Switchyard & Converter Stn. Ready for Operation | October 2017 | July 2017 | Revised |
| Ready for Power Transmission | October 2017 | September 2017 | Revised |
| Soldier's Pond Synchronous Condenser Ready for Operation | November 2017 | June 2017 | Revised |
| Commissioning Complete - Commissioning Certificate Issued | June 2018 | June 2018 | Under review Formatted: Not Highlight |
| Labrador Transmission Assets | Planned Date March 2015 | Actual/Forecast August 2015 | Status |
| Project Sanction | December 2012 | December 2012 | Complete |
| Hvac Transmission Line Construction Complete | June 2016 | September 2016 | Revised |
| Churchill Falls Switchyard Ready to Energize | May 2017 | May 2017 | No change |
| Muskrat Falls Switchyard Ready to Energize | May 2017 | May 2017 | No change |
| Ready for Power Transmission | May 2017 | May 2017 | No change |
| Commissioning Complete - Commissioning Certificate Issued | June 2018 | June 2018 | Under review Formatted: Not Highlight |

Project Risks

Given the size and complexity of the Project, it is important that any risks continue to be proactively identified and monitored and that mitigation measures are implemented as appropriate. The Committee continues to review Nalcor’s monthly risk report and meets regularly with Nalcor officials to discuss major project risks and mitigation strategies.

Based on the Committee’s review of the risk ~~register~~report for the period ending June 2015 (~~latest available register~~), the Committee focused on providing updates with respect to the following risks:

1. **Risk of Project Schedule Delays**
2. **Risk of Cost Escalation for Muskrat Falls Generation Facility**

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1. Risk of Project Schedule Delays

~~Contractor performance in the Powerhouse & Intake remains a key area of focus for the contractor and Nalcor.~~ While there has been significant improvement in concrete placement rates over the summer period and risk levels for certain areas, including the North Spur and River Diversion in 2016, have decreased in the risk ~~register~~report since March 2015, ~~the risk assessments remains high for contractor performance causing schedule delays and Powerhouse due to powerhouse concrete placement remains high and is receiving a great deal of attention.~~

River diversion in 2016 is a critical milestone and is directly related to the civil construction associated with the Muskrat Falls Generating Facility, more specifically with the work on the Spillway and Gates. The Committee notes that to avoid Project schedule delays significant ~~productivity~~production improvements in concrete placement and schedule performance will continue to be required in the short term, with those projected improvements consistently ~~being maintained~~aligned with the established targets in the future. As previously referenced, the Milestone Dates relating to the Muskrat Falls Generating Facility remain under review at this time.

The Committee questioned Nalcor as to its assessment of risk for not achieving River Diversion in 2016. Nalcor responded that there are always risks associated with a project of this magnitude. The Nalcor Project Team is working diligently to manage the risks that it can directly control. As discussed in the previous section on the status of the Spillway and Gates, the River Diversion in 2016 is the next major activity on the Project Critical path. In order to achieve this event, work on the North Spur work must be complete, the Spillway concrete works and mechanical outfitting have to be advanced enough to ~~be able to~~control the gates

and the river closure work must be progressed to cut off the natural flow path of the river. All of these activities are currently on target.

2. Risk of Cost Escalation for Muskrat Falls Generation Facility

~~[NTD: Please review given commercial sensitivity and possible claims issues but need to message Cost risk on this issue?]~~

Nalcor advises that the remaining cost risks for the Project are much reduced. As the Project has advanced and construction is well underway on all components, potential high risk activities which impacted project costs have been achieved and the Capital budget has been adjusted where required. All major contracts have been awarded or are through advanced evaluation which includes the majority of contract costs. The majority of materials have been ordered and costs are committed.

There is some remaining potential risk associated with the awarded Contracts contracts which have a reimbursable or time and material content and as well as risk for potential claims. The remaining project cost risks are in the Contractor Performance associated with contractor performance, which can be impacted by many things and is a major part of Nalcor's the Nalcor project management team's attention. Other remaining risks include weather; geotechnical conditions; and commissioning, startup and integration. The

Nalcor noted that the Contingency of \$186.8 million is designed to cover these potential risks and has been estimated in accordance with the low range advised by the Association for the Advancement of Cost Engineering International (ACEI) standard, the as the following conditions have been met:

- The expected accuracy range for a project with a high percentage of definition with contracts placed, engineering;
- Engineering and purchasing complete, overall; and
- Overall progress of the project over 50%, per cent.

The ACEI standard for the hydropower industry states that the accuracy of the capital cost at this stage of a project is between -3% to +3%, per cent. Nalcor has used 4% per cent on the remaining scope of the project. Nalcor advises that it sets aggressive contingency amounts in order to drive costs as low as possible.

The Committee notes that significant schedule pressures with respect to the Muskrat Falls Generating Facility remain. The performance of the civil contractor for the Muskrat Falls Generating Facility, while recently improved remains an ongoing concern area of focus given the schedule slippage already incurred. It will be critical for the civil contractor to sustain the productivity production improvements to avoid further schedule slippage and may require

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~~acceleration of work~~ additional efforts from certain Project contractors. This could impact costs beyond the Project execution risk contingency that has been established.

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Other Oversight Activities

The Committee provides the following update with respect to additional oversight activities.

Independent Engineer

From March 13 to 16, 2015 the Independent Engineer accompanied Nalcor representatives on a factory visit to the Andritz facility in Chengdu, China where the turbines and generators are being manufactured. Based on the site visit the Independent Engineer concluded that the workmanship of the manufacturing work was very good and the most up-to-date technologies and tools were being used during the manufacturing process. The Independent Engineer also noted that in general good safety procedures were being observed during manufacturing.

Subsequently, ~~On~~ March 19, 2015 the Independent Engineer also accompanied Nalcor representatives on a site visit to the Nexans facility in Futtsu, Japan. The purpose of this visit was to verify the status of work and review the quality of processes for the manufacturing of the submarine cables for the Strait of Belle Isle cable crossing as well as the High-Voltage underground cables. The Independent Engineer found the manufacturing workmanship to be very good and observed that the manufacturing process thus far has been carried out in compliance with very high standards of safety, quality and environmental criteria. The Engineer also reported that the work under this contract appears to be on schedule.

The official reports on both site visits were released in August 2015 and can be found on the Committee's website at: www.gov.nl.ca/mfoversight/engineer/ or, on Nalcor's website at: <https://muskratfalls.nalcorenergy.com/newsroom/reports/>

The Independent Engineer also made a site visit to the Muskrat Falls ~~Generation Facility~~ site during July 6 to ~~8~~9, 2015. Committee representatives accompanied the Independent Engineer on this site visit. The Independent Engineer's report on the site visit ~~is anticipated in late 2015. A copy of this report will be made available through the Committee's website as soon as it becomes available.~~ was issued to Nalcor on September 11, 2015. The report concludes:

"Overall, the project is managed and progressing well. However, fully meeting the current overall schedule for the powerhouse and intakes will be a significant challenge, not impossible, but likely not probable. The IE also notes that such scheduling challenges are typical for most large hydroelectric projects."

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Nalcor's External Auditor

On August 13, 2015 Nalcor released its 2015 Q2 Financial Report which included unaudited consolidated interim financial statements for the three and six months ended June 30, 2015 along with the associated Management Discussion and Analysis. Nalcor's Internal Audit Committee has reviewed this report. The document can be found on Nalcor's website at:

<http://www.nalcorenergy.com/uploads/file/Nalcor%20Energy%202015%20Q2%20Financial%20Report.pdf>

The Report indicates that capital expenditures for the project for Q2 2015 were \$509.7M and \$830.1 million year-to-date. This represents an increase of \$231.6 million for the quarter and \$364.2 million year-to-date compared to the same period in 2014. The Q2 capital expenditures included \$199.7 million for Muskrat Falls Generating Facility, \$93.7 million for Labrador Transmission Assets and \$178.1 million for the Labrador-Island Transmission Link.

The unaudited financial statements also reported on capital costs incurred on the Maritime Link, which is owned and financed by a subsidiary of Emera Inc. Capital expenditures for the Maritime Link for Q2 2015 were \$94 million, bringing the total expenditure for that project to date to \$526 million.

Other Assurance Reviews [NTD: Need Nalcor reply to populate]

In fulfilling its mandate, throughout the construction period the Committee will examine issues such as whether management processes and controls are well designed and followed. The Committee provides the following update:

1. Project Controls for Cost and Schedule

~~Under the reporting protocols established with Nalcor, the Committee has access to a significant amount of Project information, including contractor reports, reports prepared for senior management and the Board of Directors, risk reports and reports of the Independent Engineer. To supplement these sources of information, the Committee also meets regularly with Project senior officials to pose questions regarding observations and to discuss overall Project progress. As part of the Committee's due diligence, as noted in the September 2014 previous Committee Report Reports, Ernst & Young, LLP (EY), in its role as consultant to the Committee, wahas been engaged to undertake a review of the Project Controls for Cost and Schedule ~~which included an assessment of the:~~~~

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- ~~adequacy of Nalcor's cost and schedule management processes and controls as it manages and reports on the execution of the Project;~~
- ~~consistency of Nalcor's use of these processes and controls in key areas of the Project; and~~
- ~~extent of reliance the Committee could place on Nalcor's reporting for cost and schedule forecasts.~~

~~The scope of work did not include a review of the estimating processes and cost baseline process, the accuracy of the forecasted costs or schedule dates for the contractors or the Project as a whole or change management and risk management processes.~~ EY has completed execution of this work and has finalized their report outlining key observations and recommendations to the Committee. In completing the review, EY selected a sample of five (5) of the major contractors.

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The report acknowledges that:

- ~~Key project control processes have been developed;~~
- ~~Project reporting is in place summarizing key information on construction cost and schedule;~~
- ~~Nalcor continues efforts to work with contractors on maintaining a disciplined approach to project management, control and reporting;~~
- ~~Proactive measures are taken to manage potential claims;~~
- ~~There is active formalized management of cost and schedule issues and risks arising during the Project;~~
- ~~A matrix organizational structure has been established, responsible for managing the Project; and~~
- ~~Nalcor is using a set of conventional management processes and controls for the Project.~~

The report, however, also outlines some key aspects of the management processes and controls that at the time of EY's review were not fully developed and deployed as follows.

Key Schedule Management Process and Control Risks and Issues

1. ~~For three of five of the samples selected, contractor Control Schedule Baselines Documents and Schedule Development and Control Plans were incomplete and/or did not meet the criteria defined in Nalcor's processes.~~
2. ~~A majority of contractors' schedule updates included in the Sample were not systematically rolled up into the Nalcor Integrated Project Schedule (IPS).~~
3. ~~A completion date has not been established for finalizing an integrated baseline of contractor and IPS schedules to correct the issues noted in #1 and #2 above.~~
4. ~~The IPS development and maintenance process is not fully documented.~~

Key Cost Management Process and Control Risks and Issues

- ~~1. The conditions and processes for rebaselining cost and schedule are not defined in the Project's control processes and procedures. The Oversight Committee's understanding of such conditions and processes is an important foundation, as it conducts its oversight activities.~~
- ~~2. Nalcor uses a relatively basic approach to contingency forecasting which in our (EY) experience is not consistent with the expected practices for a project of this scale and complexity. It is not clear whether the cost contingency forecasts for the Project are adequate.~~
- ~~3. The Project does not define thresholds for variance management, reporting, and escalation purposes. We would normally expect these to be in place as they assist in giving clear indications of the severity of issues and the need to escalate to key stakeholders, such as the Oversight Committee.~~
- ~~4. A fully quantified risk or trend has not been documented for the most significant challenges related to work performed by a key contractor included in the Sample. The scale of potential challenges is not quantified in the summary reporting made available to the Oversight Committee.~~

~~The report advises that until such time as the noted management process and controls risks and issues are addressed, the completeness and accuracy of Project schedule and cost forecasting status reporting to the Committee cannot be fully verified. The Committee has directed Nalcor to define corrective action in response to these observations and the Committee will continue to monitor implementation of these actions.~~

Nalcor Response to the Observations

~~Nalcor Energy executes its management of the Muskrat Falls Project through its Owners Project Management Team (Owners Team). The Owners Team is in place to directly oversee and manage contractor performance and ensure current and outlook information is provided to senior management, the Boards of Directors, the Oversight Committee, the Independent Engineer, Canada and members of government on a timely basis.~~

~~There are multiple processes and inputs into the Owners Team to enable them to assess project performance for decision making and ongoing management of the Project. One of these inputs is contractor supplied cost, schedule, safety and quality data. The Owners Team overlays analysis and perspective on the information available to them, uses this information to oversee and manage the project on an ongoing, real time basis, ensuring that commercial considerations do not cloud actual performance, and information reported reflects such perspective.~~

~~Due to the significant commercial sensitivity of multiple interactions with contractor(s) on an ongoing basis, it is critical to ensure that the Oversight Committee and members of~~

government are informed of developments and outlooks on a timely basis, while at the same time ensuring formal documentation provided to the oversight process and available to the public, and thus accessible to contractors, is not available publically until such time any related commercial issues are resolved with contractors. The intent is to ensure oversight participants are aware of unfolding events on a timely basis, while at the same time ensure commercially sensitive information is not a draft report to the Committee. A copy of the report has been shared with contractors in a manner which could be used against the Project in an unacceptable manner. The two key channels for oversight information is verbal interaction at Oversight Committee meetings and ongoing discussion on a regular basis covering all topics. This is supplemented by regular printed reports and documentation provided on a monthly basis prepared in such a way that commercially sensitive information is not available to the contractor until such commercial sensitivity has passed.

The Oversight Committee has direct access to both Naleor and LCP leadership, engages in regular meetings and Site Visits to review and discuss project progress and emerging risks, and also has the benefit of the Project's Independent Engineer to advise on relevant technical issues. We observe that E&Y advocates inclusion of these types of "strategie" risks in "project" level reporting, but our management approach, consistent with the advice provided by our Risk Consultant has been to separate them and to discuss strategic risks at the most senior leadership level. As such risks materialize, disclosure and discussion at the leadership level is a more appropriate way to evaluate and discuss strategies to address such issues than to provide "reporting" on a project basis.

In reviewing the key findings, LCP believes that E&Y has generally described LCP's project control management processes for cost and schedule. LCP has not implemented a full Earned Value Management System for LCP, but rather has focused its use of such a process on construction progress for the Project. E&Y has advocated for the use of a full Earned Value Management System, which would include supplier procurement, engineering, and fabrication processes. LCP made a conscious decision not to implement such a process for the following reasons: [NTD: Please review EY report comments. Response appears focused solely on manufacturing contracts. EY comments on Earned Value are broader based and do not relate solely to the integration of these manufacturing contracts.]

- a) At the most fundamental level, such value is not truly 'earned'. Unlike construction activities, where concrete is placed at the owner's site, or transmission towers are erected, the project owner has no title to activities undertaken by a supplier at their premises. Internal supplier engineering and fabrication have no value until they result in a completed product and are shipped to site. Supplier progress is measured by the LCP project team directly, and estimates of supplier progress are completed by the LCP project team directly.

b) From a commercial perspective, LCP has no claim to partially completed internal work and would not be in a position to realize partially earned value in the event of a dispute.

e) To the extent that we rely on suppliers to report on their progress, visibility into contractors' progress would be clouded by the fact they are reporting on their own progress.

For these reasons, LCP has elected to measure suppliers' progress through direct progress reporting and an assessment of their ability to achieve key milestones.

In specific response to the issues raised above by Ey, Nalcor provides the following response:

1. For three of five of the samples selected, contractor Control Schedule Baseline Documents (CSBD) and Schedule Development and Control Plans (SDCP) were incomplete and/or did not meet the criteria defined in Nalcor's processes.

Response: — These are contractor documents, and LCP has identified deficiencies that must be corrected until they can be accepted by LCP.

2. A majority of contractors' schedule updates included in the sample were not systematically rolled up into the Nalcor IPS.

Response: — Referring to observation 1, incomplete or otherwise non-compliant schedules would not be accepted into the IPS. Issues with them must be resolved before they can be included. Two of the five contracts were awarded in late 2014, and the respective contractors had not completed their schedule input during the test period. One other contract (Astaldi), has not completed an acceptable schedule for input into the IPS. Nalcor is working diligently with this Contractor and all Contractors to provide schedules which meet the contractual obligations. This is an ongoing effort.

3. A completion date has not been established for finalizing an integrated baseline of contractor and IPS schedule to correct the issues noted in #1 and #2 above.

Response: — LCP is working diligently and cooperatively with each of its contractors to achieve complete, accurate, and up to date information for inclusion in the IPS. Nalcor is working with the Contractors at senior management levels and at site level to assist them to produce

acceptable schedules which comply with the contract milestone dates, until such time as an acceptable schedule is developed and accepted by Nalcor the IPS baseline schedule will be used. Nalcor is working towards a re-baseline of the IPS in Q4 of 2015, ensuring a comprehensive outlook with appropriate mitigation activities incorporated, ensuring commercial considerations are appropriately considered.

4. The IPS focuses on three domains, namely construction, commissioning, and operations start-up. The IPS does not include information on three other domains, namely, engineering, procurement, and fabrication.

Response: — Nalcor has decided to focus on the construction, commissioning and startup activities in the IPS for the following reasons: Engineering as performed mainly by SNC-L has been completed with only follow on engineering remaining; procurement is largely complete and the few remaining procurement activities are being managed effectively and inclusion in the IPS would not provide any appreciable benefit; and the remaining activities which fall under engineering, procurement and fabrication are being performed under EPC type contracts and as such are being managed at the Contract level and Nalcor considers this to be managed more effectively outside of the IPS.

In relation to contractor earned value, E&Y advocates that it would provide additional useful information to the Oversight Committee. LCP disagrees with this position. As previously discussed, the contractor efforts in engineering, procurement, and fabrication are not truly earned, and LCP believes that a direct assessment by project management team members of contractors' progress in these areas and their ability to achieve critical project milestones is a more useful approach than an arbitrary view of contractor progress through an 'earned value' lens.

The detailed comments and observations provided in relation to the schedule management process compliance provide further detail regarding the 4 key findings noted above, with one addition. Reference is made to reported progress "... could be viewed as subject to interpretation and not wholly objective." Given the nature of the differences presented in Appendix C, there is no basis to assert the reporting is not objective. LCP acknowledges the process is necessarily subjective, and requires appropriate insight and experience to properly interpret and report contractors' progress.

LCP agrees that it is important to have complete and accurate contractor reporting. It is also essential that the Project Team have its own assessment of contractor progress on all

components of the Project in order to have a first hand viewpoint of each contractor's progress.

Consideration the design of the LCP cost management process, LCP offers the following comments regarding E&Y cost management process design:

1. ~~Cost variance thresholds are not defined. These thresholds are used to establish a permissible variation from budget before documented corrective action must be taken. Variance thresholds are also used to define what constitutes a variance requiring escalation for senior management's attention.~~

Response: ~~While a threshold is not defined, a trigger is. Changes to quantities or costs in excess of the approved control budget amount require change control board approval at the AFE level, if Nalcor for final forecast cost information is forthcoming which results in any of the LIL, LTA or MF approved AFE's being exceeded then a revised AFE will be produced and submitted for Board approval. The Project team cannot commit to costs which exceed the approved AFE.~~

2. ~~The conditions and processes for rebaselining are not defined in the Project's control processes and procedures. Management indicated that rebaselining of the program was at their discretion and dependent on a variety of factors including forecast and rate of drawdown on contingency.~~

Response: ~~LCP agrees this is a project team management decision. A decision to rebaseline the project is a significant management decision that requires consideration of multiple factors. These factors include but are not limited to potential AFE exceedance, as described in 1 above, if a final forecast cost indicates potential exceedance of an Approved AFE then this would call for a cost rebaseline. Schedule rebaselines are only carried out when there is an accumulation of changes that justify such an action. Nalcor is currently working towards a schedule rebaseline. The decision to carry out a cost or schedule re-baseline is not a Project Control process rather such a decision is made at Senior Leadership levels based on the factors explained above.~~

3. ~~Detailed checklists have not been developed for the use of Nalcor cost controllers to validate contractor costs and ensure review consistency.~~

Response: ~~The contractor cost validation and payment terms are explicitly defined in the contracts that cost controllers are expected to manage. Nalcor considers that the existing cost validation methods are suitable~~

however will consider the use of checklists if there is an identified consistency concern. Nalcor internal audit will address this issue.

4. The shape of the contingency curve is conventionally defined by aggregation of the forecasted materialization of estimate uncertainties or tactical risks. The current basis of the forecast contingency drawdown curve did not include quantified material risks. This shortcoming significantly limits the ability to compare the rate of realized cost risks versus original forecast, and assess the need for additional contingency or the rebaselining of the Project's cost and schedule.

Response: — Assessment of the need for additional contingency or re-baselining cost and schedule are management decisions. In relation to material risks, these risks are discussed and reviewed directly with the Oversight Committee by Project Leadership, and are not incorporated in the official IPS and project budget until the applicable change control processes have been complete.

— The potential for additional capital requirements or schedule impacts are discussed directly at the leadership level, and once a decision to adjust the project budget or schedule is approved, then working documents for the Project are updated accordingly through the re-baseline process.

With respect to the detailed findings, Astaldi's performance and slow start up has been discussed with the Oversight Committee directly by Project leadership. LCP does not consider it appropriate to deal with strategic issues through management level reporting, particularly given their commercial sensitivity, until the commercial sensitivity has been addressed.

LCP does not universally use contractors' forecasts as the basis for the FFC, and verifies contractor reporting through other methods, including direct quantity estimates and progress reporting. LCP believes this is prudent from a management and commercial perspective. It provides the project team with first hand information to validate and confirm contractors' performance and also ensures the project team is equipped with the information necessary to address any commercial disputes.

In summary, LCP's processes address the key reporting needs of the project, and provide a suitable basis for management decision making. In conjunction with the other processes used to inform the Oversight Committee, the Oversight Committee is provided with the information necessary to understand project performance and also to understand risks that could affect it. **The Project Controls processes used by the Project Team have been**

extensively reviewed previously by Navigant, Manitoba Hydro International, Internal Audit and most recently by the Independent Engineer who reviews the Project Management role of the Nalcor Project team on an ongoing and monthly basis. All reports so far have been of a positive nature and indeed, if any of the Project Controls processes were deemed insufficient, the Independent Engineer would have identified such a deficiency to Canada; none have been reported or identified by the Independent Engineer to date. Whilst Nalcor considers all advice in these matters, the responsibility for Project Management resides with the Nalcor Project Team and Nalcor is satisfied that the Project Controls processes currently in place are suitable, adequate and reasonable and are being deployed appropriately for the purposes of project cost and schedule reporting.

A full copy of this report can be found at [\[insert link on our website\]](#). The Committee will post the EY report to the Committee [website](#) once finalized.

Next Report

The Committee will continue its oversight of the construction of the Project in accordance with its mandate and the Oversight Framework.

Appendix A

Project Budget Summary Expenditure Categories

The summary expenditure categories are described as follows:

NE-LCP Owners Team, Admin and EPCM Services: includes the labor, facilities and overhead costs of the LCP Project team as well as costs of SNC Lavalin.

Feasibility Engineering: includes the cost of early stage engineering activities which are now complete.

Environmental & Regulatory Compliance: includes costs associated with environmental assessment, permits, licenses and similar such costs.

Aboriginal Affairs: includes costs associated with activities in the aboriginal communities along with obligations under the Impact and Benefits Agreement.

Procurement & Construction: includes costs associated with the major construction activities and the award of contracts.

Commercial & Legal: includes costs associated with insurance, legal and other commercial activities.

Contingency: provision for additional expenditure, if required.

Appendix B

EY Report on Cost and Schedule Risk

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Introduction



Muskrat Falls Site – Progress on Spillway and Powerhouse – August 2015

The Muskrat Falls Oversight Committee was established by the Government of Newfoundland and Labrador in March 2014 to strengthen the existing oversight of the Muskrat Falls Project (the Project). The Committee's mandate focuses on cost, schedule and risk management for the construction phase of the Project. Reports of the Committee can be located at <http://gov.nl.ca/mfoversight>.

The Committee's last report for the quarter ended March 2015 highlighted several risks to the Project budget and schedule including that two major contracts had not yet been awarded and schedule and cost pressures were being experienced, particularly with respect to the Powerhouse & Intake contract for the Muskrat Falls Generating Facility. During the ensuing period, the Committee has been closely monitoring these risks and receiving regular updates on the Project from Nalcor. Over this period, Nalcor has finalized costing of the two outstanding contracts referenced above and identified additional cost pressures, including labour and materials for access clearing based on experience gained in the field to date. As

a result, in September 2015 Nalcor revised the Project Budget from \$6.99 billion to \$7.65 billion¹.

Project Costs

Committee Observations

- Project capital budget has increased from \$6.99 billion to \$7.65 billion.
- Incurred costs at August 2015: \$3.26 billion.
- Committed costs at August 2015: \$5.97 billion.
- Project Forecast Contingency budget at September 2015 has been revised to \$186.8 million. Risk remains for contract execution at the Muskrat Falls Generating Facility.

Project Costs

Table 1 provides information on the allocation of the adjustment in the Project budget from \$6.99 billion to \$7.65 billion among the three sub-projects. This table also includes incurred costs up to the end of August 2015, totaling \$3.3 billion². At the end of August 2015 the committed costs³ totaled \$5.97 billion.

Table 1
Project Cost Change as of September 2015 & Incurred cost as of August 2015 (in \$ thousands)

¹ Total Project costs include construction costs of \$7.65 billion plus interest and other financing costs of \$1.4 billion that will be incurred during construction, for an estimated total of \$9.05 billion.

² Incurred Costs represents the total estimated cumulative value of all goods and services provided to the Project up to the point in time regardless of whether it was paid during the current period or will be paid at some future point in time.

³ Committed Costs: The estimated value of an obligation made by the Project for the provision of goods or services; represented by a Financial Commitment. Committed costs are captured when a Financial Commitment is made and its value is based upon the original estimate for that Financial Commitment. A Financial Commitment is a legal agreement between Nalcor Energy – Lower Churchill Project (NE-LCP) and a third party which authorizes NE-LCP to proceed with the award/instruction to the third party to provide goods and/or services for an agreed price or in accordance with an agreed pricing structure. The value of the Financial Commitment is represented by the cumulative value of the original amount and any approved variation orders to the contracts or change orders to the purchase order (which may or may not be a Project scope change).

| Muskrat Falls Project | Project Budget | | Change | | Incurred Costs August 2015 |
|-----------------------------------|--------------------|--------------------|------------------|-------------|-------------------------------|
| | June 2014 | September 2015 | (\$) | (%) | |
| Muskrat Falls Generation Facility | \$3,371,988 | \$3,685,966 | \$313,978 | 9.3% | \$1,726,356 |
| Labrador-Island Transmission Link | \$2,786,481 | \$3,089,378 | \$302,897 | 10.9% | \$1,046,647 |
| Labrador Transmission Assets | \$831,945 | \$877,557 | \$45,612 | 5.5% | \$488,277 |
| Total Project | \$6,990,414 | \$7,652,901 | \$662,487 | 9.5% | \$3,261,280 |

Table 2 provides additional information on the revised Project Budget by expenditure category for each of the sub-projects.

Table 2
Project Cost Change by Sub-Project as of September 2015 (in \$ thousands)

| Muskrat Falls Generation Facility | Project Budget | | Change | |
|---|--------------------|--------------------|------------------|--------------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$382,811 | \$408,723 | \$25,912 | 6.8% |
| Feasibility Engineering | \$17,949 | \$17,949 | (\$0) | 0.0% |
| Environment & Regulatory Compliance | \$24,312 | \$25,825 | \$1,513 | 6.2% |
| Aboriginal Affairs | \$13,314 | \$13,314 | \$0 | 0.0% |
| Procurement and Construction | \$2,786,766 | \$3,121,813 | \$335,047 | 12.0% |
| Commercial & Legal | \$25,989 | \$25,239 | (\$750) | -2.9% |
| Contingency | \$120,847 | \$73,102 | (\$47,745) | -39.5% |
| Total MFGen | \$3,371,988 | \$3,685,966 | \$313,978 | 9.3% |
| Labrador-Island Transmission Link | Project Budget | | Change | |
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$225,814 | \$221,293 | (\$4,521) | -2.0% |
| Feasibility Engineering | \$21,252 | \$21,252 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$22,306 | \$14,446 | (\$7,860) | -35.2% |
| Aboriginal Affairs | \$2,244 | \$2,684 | \$440 | 19.6% |
| Procurement and Construction | \$2,426,095 | \$2,717,326 | \$291,231 | 12.0% |
| Commercial & Legal | \$16,490 | \$16,490 | \$0 | 0.0% |
| Contingency | \$72,280 | \$95,887 | \$23,607 | 32.7% |
| Total LIL | \$2,786,481 | \$3,089,378 | \$302,897 | 10.9% |
| Labrador Transmission Assets | Project Budget | | Change | |
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$99,973 | \$144,958 | \$44,985 | 45.0% |
| Feasibility Engineering | \$220 | \$220 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$710 | \$811 | \$101 | 14.3% |
| Aboriginal Affairs | \$188 | \$188 | \$0 | 0.2% |
| Procurement and Construction | \$696,322 | \$709,643 | \$13,321 | 1.9% |
| Commercial & Legal | \$3,141 | \$3,891 | \$750 | 23.9% |
| Contingency | \$31,391 | \$17,846 | (\$13,545) | -43.2% |
| Total LTA | \$831,945 | \$877,557 | \$45,612 | 5.5% |
| Total Project | \$6,990,414 | \$7,652,901 | \$662,487 | 9.5% |

Additional details of the cost increase for the revised budget by Sub-Project are provided below:

I. Muskrat Falls Generation Facility

Total budgeted costs for the Muskrat Falls Generation Facility have increased from \$3.37 billion to \$3.69 billion, a difference of \$314 million or 9.3 per cent from the June 2014 budget. This cost increase is primarily attributable to the finalization of major outstanding contracts and contractor performance.

Table 3

Muskrat Fall Generation Facility – Revised Project as of September 2015 (in \$ thousands)

| Muskrat Falls Generation Facility | Project Budget | | Change | |
|---|----------------|----------------|------------|--------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$382,811 | \$408,723 | \$25,912 | 6.8% |
| Feasibility Engineering | \$17,949 | \$17,949 | (\$0) | 0.0% |
| Environment & Regulatory Compliance | \$24,312 | \$25,825 | \$1,513 | 6.2% |
| Aboriginal Affairs | \$13,314 | \$13,314 | \$0 | 0.0% |
| Procurement and Construction | \$2,786,766 | \$3,121,813 | \$335,047 | 12.0% |
| Commercial & Legal | \$25,989 | \$25,239 | (\$750) | -2.9% |
| Contingency | \$120,847 | \$73,102 | (\$47,745) | -39.5% |
| Total MFGGen | \$3,371,988 | \$3,685,966 | \$313,978 | 9.3% |

1. Finalization of Major Outstanding Contracts

In earlier reports, the Committee noted it was monitoring the progress of three major contracts to be awarded for the Muskrat Falls Generating Facility as this was identified as a risk to the contingency budget. These three contracts were valued at approximately five per cent of the total June 2014 Project Budget. In its December Report, the Committee noted that the contract for the North Spur Stabilization Works was awarded at a higher value than originally budgeted. Since March 2015, one of the two remaining contracts - the construction of the North and South Dams was finalized and similarly resulted in those contract costs being significantly higher than original budget. Nalcor indicates that this cost escalation is reflective of increased market pressures and will also apply to the remaining contract, the supply and installation of the Mechanical and Electrical auxiliaries, which is still under review. The cost increases associated with these two major contracts and the third contract is reflected in the increase in the budget for Procurement and Construction category in Table 3 above.

2. Contractor Performance on the Muskrat Falls Generation Facility

In its March 2015 Report, the Committee noted continued slippage in schedule progress at the Muskrat Falls Generating Facility, specifically the **Powerhouse & Intake**. The Committee observed an increase in risk levels associated with contractor performance; powerhouse

concrete placement rates; and readiness for river diversion in 2016. Nalcor continues to work with the contractor to implement the mitigation plan which involves ramping up labor and production in an effort to get back on schedule. The additional efforts at the Muskrat Falls Generation Facility are inducing additional cost pressures on the project. Nalcor does have a provision in the contract with the main civil contractor to mitigate exposure to labour cost increases.

In addition, to ensure continued production improvements and minimize risk of further schedule slippage, Nalcor has increased the budget for additional project management resources and centralized camp services for both contractor and project management personnel. This is expected to increase project management costs under the category NE-LCP Owners Team, Admin and EPCM Services above.

II. Labrador Island Transmission Link

Total budgeted costs for the Labrador Island Transmission Link have increased from \$2.79 billion to \$3.09 billion, a difference of \$302.9 million or 10.9 per cent.

Table 4

Labrador Island Transmission Link – Revised Project as of September 2015 (in \$ thousands)

| Labrador-Island Transmission Link | Project Budget | | Change | |
|---|----------------|----------------|-----------|--------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$225,814 | \$221,293 | (\$4,521) | -2.0% |
| Feasibility Engineering | \$21,252 | \$21,252 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$22,306 | \$14,446 | (\$7,860) | -35.2% |
| Aboriginal Affairs | \$2,244 | \$2,684 | \$440 | 19.6% |
| Procurement and Construction | \$2,426,095 | \$2,717,326 | \$291,231 | 12.0% |
| Commercial & Legal | \$16,490 | \$16,490 | \$0 | 0.0% |
| Contingency | \$72,280 | \$95,887 | \$23,607 | 32.7% |
| Total LIL | \$2,786,481 | \$3,089,378 | \$302,897 | 10.9% |

In previous reports, the Committee noted that there had been drawdowns on contingency for changes relating to steel towers, foundation types, and additional materials required for the Labrador-Island Transmission Link. Nalcor reports that as work progressed for clearing right-of-way access roads, the geotechnical conditions encountered, particularly in Central Labrador, were significantly more challenging than originally anticipated. Based on experience to date and recent in-depth field experience of the ground conditions, Nalcor has confirmed that additional labour and materials will be required to complete this work. As contracts for this work are time and material contracts, an increase in labour and materials will directly result in an increase in contract costs. Harsher than normal winter conditions

has also impacted labour productivity, resulting in projected additional labour hours to complete the work.

In addition, given the geotechnical conditions encountered, Nalcor has enhanced the tower and foundation design in certain areas to ensure reliability of this infrastructure. This change in design, combined with investments towards road infrastructure (including bridges and culverts) to improve year around access reliability in remote areas, will also increase anticipated costs.

A change in foreign exchange rates has also resulted in an increase in contract costs for the contract for the Switchyard, Converter and Synchronous condensers by \$20M. Nalcor advises that the impact of the reduction in the value of the Canadian dollar has been largely avoided. Although significant purchases are being made outside Canada, many of these contracts were either priced in Canadian dollars at the date of execution, or the goods were delivered and payments made prior to the devaluation of the Canadian dollar.

The anticipated cost escalation as outlined above is reflected in the increase in the budget for Procurement and Construction and Contingency categories in Table 4.

III. Labrador Transmission Assets

Total budgeted costs for the Labrador Transmission Assets have increased from \$831.95 million to \$877.56 million, a difference of \$45.6 million or 5.5 per cent.

Table 5

Labrador Transmission Assets – Revised Project as of September 2015 (in \$ thousands)

| Labrador Transmission Assets | Project Budget | | Change | |
|---|----------------|----------------|------------|--------|
| | June 2014 | September 2015 | (\$) | (%) |
| NE-LCP Owners Team, Admin and EPCM Services | \$99,973 | \$144,958 | \$44,985 | 45.0% |
| Feasibility Engineering | \$220 | \$220 | \$0 | 0.0% |
| Environment & Regulatory Compliance | \$710 | \$811 | \$101 | 14.3% |
| Aboriginal Affairs | \$188 | \$188 | \$0 | 0.2% |
| Procurement and Construction | \$696,322 | \$709,643 | \$13,321 | 1.9% |
| Commercial & Legal | \$3,141 | \$3,891 | \$750 | 23.9% |
| Contingency | \$31,391 | \$17,846 | (\$13,545) | -43.2% |
| Total LTA | \$831,945 | \$877,557 | \$45,612 | 5.5% |

In previous reports, the Committee noted that there had been drawdowns on contingency for changes relating to additional foundations and mechanical rock anchors for the transmission line and backfill required for the foundations of some transmission towers for the Labrador Transmission Assets.

Although to a much lesser degree than noted above for the Labrador-Island Transmission Link, the geotechnical conditions encountered for the Labrador Transmission Assets were more challenging than originally anticipated. As a result, Nalcor has indicated that

additional labour and materials will be required to complete this work. Recommended design changes to the AC Line and switchyard layout at Muskrat Falls and Churchill Falls to respond to geotechnical conditions will also result in increased costs. Harsher than normal winter conditions have also impacted labour productivity resulting in projected additional labour hours to complete the work. The anticipated cost pressures as outlined above are reflected in the increase in the budget for Procurement and Construction category in Table 5.

In addition, as reflected in Table 5, Nalcor has increased project management resources for the Labrador Transmission Assets to increase the focus on safety and mitigate risks associated with the time and material contracts for the Right of Way activities. This is expected to increase project management costs under the category NE-LCP Owners Team, Admin and EPCM Services.

Additional information on the revised Project Budget can be found on Nalcor's website.

Project Schedule Performance

In this section, the Committee provides information on actual schedule progress compared to planned schedule progress for the period ended August 2015. Readers are cautioned that Nalcor is currently establishing new baselines for the Project schedule and that the planned progress reference measures will change when the new baseline is complete. The progress measures provided here are in reference to the original planned schedule to August 2015.

Committee Observations

- Schedule pressures continue to be experienced at the Muskrat Falls Generating Facility's Powerhouse and Intake.
 - Critical Path for River Diversion in 2016 remains on track.
 - Risk of schedule delays remains high due to powerhouse concrete placement.
 - Critical Path to first power for December 2017 is under review.
 - Project Milestone Dates for Muskrat Falls Generating Facility are currently under review.

At August 2015

- Actual Construction Progress 33.5 per cent. Planned Progress 43.3 per cent. Variance of 9.8 per cent behind schedule.
 - Progress on the Muskrat Falls Generating Facility continues to track slower than planned.
 - Schedule progress is 23.4 per cent behind plan for the Powerhouse and Intake.
 - Schedule has been corrected on the Spillway and Gates and is currently 3.4 per cent ahead of plan.
 - Mitigation actions continue to be implemented.
 - Progress on the Labrador-Island Transmission Link is tracking 6.3 per cent behind plan.
 - Schedule variance relate primarily to progress on the transmission line installation.
 - Progress on the Labrador Transmission Assets is tracking 5.3 per cent behind plan.
 - Schedule variance relates primarily to work at switchyards.

Muskrat Falls Project

This section provides an overview of the planned schedule to August 2015, first on an overall Project basis, and then by each of the sub-projects.

Schedule

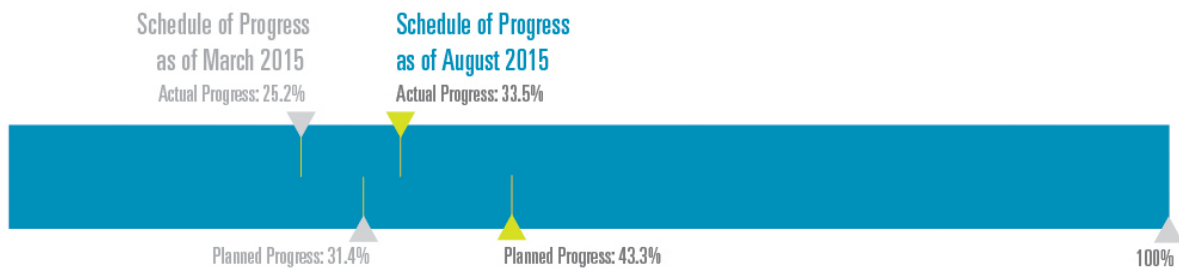
Nalcor monitors and reports schedule progress on all activities, both construction and manufacturing. Construction activities include all those activities occurring at site locations in the province. Manufacturing activities include those supply/install contracts that take place outside the province (e.g. the generators are being manufactured in China).

Construction Activities

Construction activities are mainly monitored and reported on an ongoing installation/construction progress basis, while manufacturing activities are generally monitored and reported based on a Milestone and/or delivery date basis.

Construction has continued to advance on the Muskrat Falls Project since March 2015. As outlined in Figure 2 and detailed in Table 6, overall Project schedule progress at the end of August 2015 is 33.5 per cent as compared to a planned schedule progress of 43.3 per cent, a variance of 9.8 per cent lower than planned [March 2015 Report variance was 6.2 per cent lower than planned].

Figure 2
Muskrat Falls Project – Schedule of Progress at August 2015
(including March 2015 comparison)



Schedule progress is distributed among the three sub-projects as outlined below. Progress variance continues to relate primarily to the Muskrat Falls Generating Facility which despite a narrowed slippage between June and August 2015, continues to track behind schedule. Since March 2015, there has been increased slippage on both the Labrador-Island Transmission Link and the Labrador Transmission Assets sub-projects. Further information regarding the progress schedule is provided in the section below by sub-project.

Table 6
Planned Construction Schedule Progress vs. Actual Schedule Progress – August 2015

| Muskrat Falls Project: Sub-Project | Planned Schedule Progress – August 2015 | Actual Schedule Progress – August 2015 | Variance August 2015 | Variance June 2015 | Variance March 2015 |
|------------------------------------|---|--|----------------------|--------------------|---------------------|
| Muskrat Falls Generating Facility | 48.8% | 34.8% | -14.0% | -14.3% | -11.7% |
| Labrador-Island Transmission Link | 33.4% | 27.1% | -6.3% | -5.5% | -1.4% |
| Labrador Transmission Assets | 57.1% | 51.8% | -5.3% | -2.1% | 1.0% |
| Total | 43.3% | 33.5% | -9.8% | -9.3% | -6.2% |

Sub-Project: Muskrat Falls Generating Facility

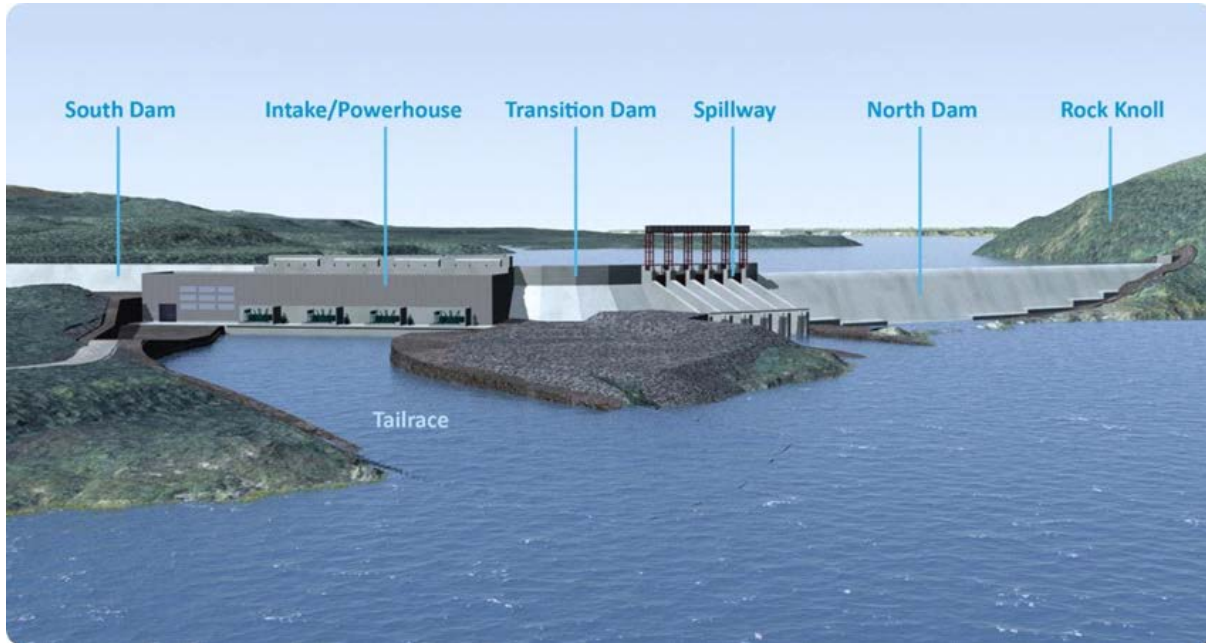
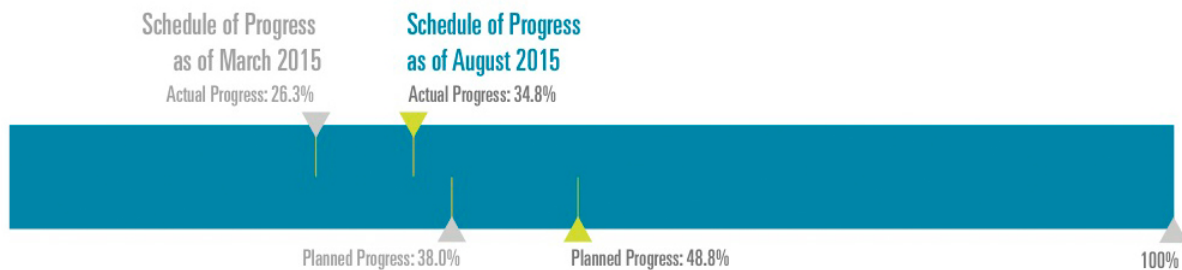


Figure showing the Muskrat Falls Generating Facility

Schedule

As of the end of August 2015, the actual construction progress for the generating facility was 34.8 per cent complete compared to a planned progress of 48.8 per cent complete, a variance of 14.0 per cent behind the planned schedule [March 2015 Report variance was 11.7 per cent behind the planned schedule].

Figure 4
Muskrat Falls Generating Facility – Schedule of Progress at August 2015
(including March 2015 comparison)



This schedule variance is mainly attributable to three activities within the generating facility sub-project:

- North Spur Stabilization
- Powerhouse & Intake

- o Reservoir Preparation

The progress status of each of these activities is summarized in Table 7:

Table 7
 August 2015 - Construction Activity for the Muskrat Falls Generating Facility
 - Planned Progress vs. Actual Progress

| Construction Activity | August 2015 Cumulative % | | | June 2015 Variance | March 2015 Variance |
|--------------------------|--------------------------|----------|--------------|--------------------|---------------------|
| | Planned | Actual | Variance | | |
| <i>Activity</i> | <i>A</i> | <i>B</i> | <i>B - A</i> | <i>C</i> | |
| North Spur Stabilization | 41.6% | 16.6% | -25.0% | -25.8% | -21.2% |
| Powerhouse & Intake | 41.9% | 18.5% | -23.4% | -22.9% | -18.3% |
| Reservoir Preparation | 71.5% | 60.8% | -10.7% | -6.2% | 0.6% |

North Spur Stabilization

As outlined in the Committee’s September 2014 report, the planned date for the North Spur Works Ready for Diversion Milestone was revised from November 2015 to September 2016. Nalcor advises that the slippage recorded in the current schedule with respect to the North Spur Stabilization Works, is not reflective of the revised plan date for this work activity. As a result, as noted in previous reports, Nalcor advises that the progress will continue to track behind current plan for this scope of work until a new baseline of the work schedule is set based on this revised execution strategy. This re-baselining of the schedule for the North Spur Stabilization Works is expected to be completed in November 2015. Nalcor advises that stabilization work is progressing well at the North Spur and the geotechnical conditions encountered to-date, are as expected.



Muskrat Falls Site – Progress on North Spur – August 2015

Powerhouse & Intake

The progress on the **Powerhouse & Intake** continues to fall behind against the original contractor's schedule. As of the end of August 2015, the actual construction progress for the Reservoir Preparation was 18.5 per cent complete compared to a planned progress of 41.9 per cent complete, a variance of 23.4 per cent behind the planned schedule [the March 2015 variance was 18.3 per cent behind planned schedule].

Nalcor advises they are working diligently with the civil contractor to improve concrete placement rates and achieve increased and sustained production rates during each season. The Project's critical path required that priority be placed on the Spillway and Gates in order to achieve river diversion in 2016. As a result, resources were concentrated on these activities which caused some further schedule slippage on the Powerhouse and Intake. There are ongoing discussions with the civil contractor to determine timelines for the completion of the remaining work in the Powerhouse and Intakes.

The Committee notes that the Integrated Project Schedule indicates that the tracking milestone on the critical path to first power for December 2017 has been removed pending Nalcor's current review of the Project Milestone Dates for the Muskrat Falls Generating Facility.

The Independent Engineer states in the recent site visit report that *"... fully meeting the current overall schedule for the powerhouse and intakes will be a significant challenge, not impossible, but likely not probable."*



Progress on the Powerhouse at the Muskrat Falls Site – August 2015

Reservoir Preparation

The Committee has observed a notable change in the progress on the Reservoir Preparation since the March 2015 report. As of the end of August 2015, the actual construction progress for the Reservoir Preparation was 60.8 per cent complete compared to a planned progress of 71.5 per cent complete, a variance of 10.7 per cent behind the planned schedule [the March 2015 variance was 0.6 per cent ahead of the planned schedule]. Nalcor indicates that there is considerable float in the reservoir preparation work, it is not on the critical path and will not impact river diversion. As a result, the contractor resources have been reassigned to the clearing work on the Labrador Island Transmission Link which is closer to a critical path milestone. The current forecast date for the reservoir clearing is under review.

Spillway and Gates

The Committee notes that for the period April to August 2015, considerable progress has been reported for the Spillway and Gates sub-project. As of the end of August 2015, the actual construction progress for the Spillway and Gates was 58.0 per cent complete compared to a planned progress of 54.6 per cent complete, a variance of 3.4 per cent ahead of the planned schedule [March 2015 Report variance was 9.0 per cent behind the planned schedule]. Nalcor has advised that Spillway concrete work will be significantly complete in 2015 and is on target to achieve River Diversion in 2016.

Sub-Project: Labrador-Island Transmission Link

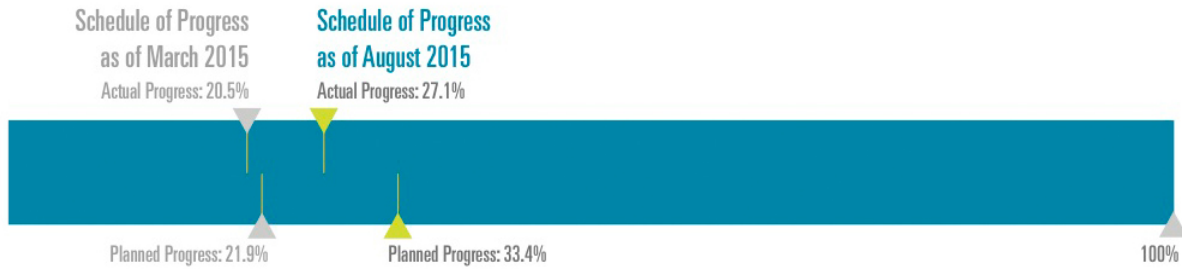


Figure showing the route for the Labrador-Island Transmission Link by Segment

Schedule

As of August 2015, the actual construction progress for the Labrador-Island Transmission Link was 27.1 per cent compared to a planned progress of 33.4 per cent complete, a variance of 6.4 per cent behind planned schedule [March 2015 Report variance was 1.4 per cent behind planned schedule].

Figure 6
 Labrador-Island Transmission Link – Schedule of Progress at August 2015
 (including March 2015 comparison)



Nalcor advised that the increased slippage in schedule performance is mainly due to challenging geotechnical conditions being experienced, particularly in Central Labrador affecting clearing, access, and tower foundations works. The spring thaw also caused severe conditions at the work sites, resulting in the temporary lay-off of employees while awaiting improvement. There was also some lost production following the Quebec Innu protest and blockade.



Progress on the HVdc Transmission Line (Labrador-Island Transmission Link) – August 2015

Sub-Project: Labrador Transmission Assets

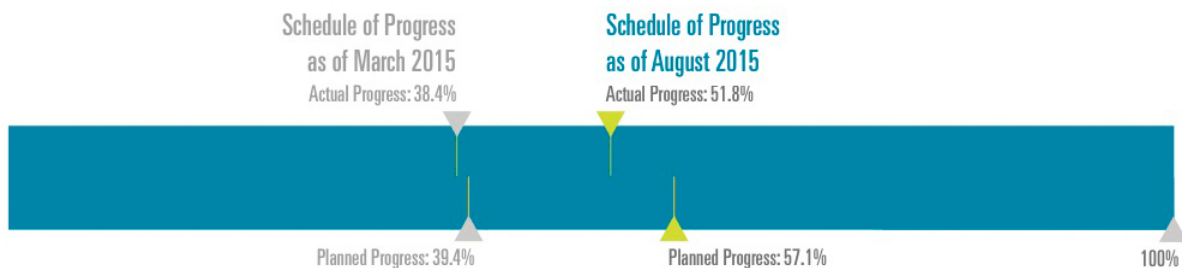


Figure showing the route for the transmission line for the Labrador Transmission Assets

Schedule

As of the end of August 2015, the actual construction progress for the Labrador Transmission Assets was 51.8 per cent complete as compared to a planned progress of 57.1 per cent complete, a variance of 5.3 per cent behind planned schedule [March 2015 Report variance was 1.0 per cent behind planned schedule].

Figure 8
Labrador Transmission Assets – Schedule of Progress at August 2015
(including March 2015 comparison)



Nalcor advised that there was some slippage in schedule performance, due to the geotechnical conditions encountered at the switchyards at both Churchill Falls and at Muskrat Falls which required design modifications and delayed start of civil work. The temporary layoff during the spring thaw also affected progress on the LTA. However, all work here is expected to catch up to forecast.



Progress on the HVac Transmission Line (Labrador Transmission Assets) – August 2015

Manufacturing Activities

The six material manufacturing supply and install contracts awarded to date are as follows:

- Turbines and Generators;
- Powerhouse Hydro-Mechanical Equipment;
- HVdc Convertors and Transition Compounds;
- Submarine Cable for the Strait of Belle Isle crossing;
- AC substations; and
- Synchronous Condensers for the Soldiers Pond Switchyard.

A summary of progress on these manufacturing activities as of the most recent Manufacturing report available:

The **Turbine and Generators** contract continues to track behind the original contract schedule based on July 2015 contractor report – 35.39 per cent complete as compared to a planned progress of 48.59 per cent, representing a variance of 13.2 per cent (10.01 per cent in March 2015). Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery dates. In its Draw Certificate dated August 27, 2015, the Independent Engineer continues to note that there is considerable float between the site need date in the Integrated Project Schedule and the contract schedule, and that there is currently no cause for concern; however, the Project team is monitoring manufacturing delivery dates to ensure that the site-need dates are not compromised.

The contractor's report for the **Powerhouse Hydro-Mechanical Equipment** for the month of June 2015 indicates the project progress is at 24.67 per cent complete as compared to a planned progress of 39.12 per cent. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery.

The contractor's report for the **HVdc Convertors and Transition Compounds** for the month of May 2015 indicates that actual project progress is 12.1 per cent against a baseline planned progress of 18.9 per cent. The report indicates that part of this slippage is due to the re-aligning of the engineering phase, with the priority given to the Civil Works deliverables and procurement. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery.

For the period ended August 2015, the **Submarine Cable for the Strait of Belle Isle** crossing is tracking slightly behind schedule with cumulative progress of 53.74 per cent complete as compared to a planned progress of 57.66 per cent.

The contractor's report for the **AC Substations** for May 2015 indicates that overall progress is ahead of the base line schedule by 0.3 percent with actual progress of 12.1 per cent complete compared to a planned progress of 11.8 per cent. The report notes that despite delays in engineering progress, the overall progress of the project exceeds the planned progress due to the progress made in procurement.

The contractor's report for the **Synchronous Condensers** for the month of June 2015 indicates the project progress is at 15.8 per cent complete as compared to a planned progress of 27.2 per cent. Nalcor advises that this is within the contract schedule variance tolerances and the equipment remains on track to meet the planned delivery. Notwithstanding, the contractor is studying the issues that have potentially caused the delay and is organizing a workshop with their subcontractors and Nalcor to troubleshoot and devise work plans to correct any schedule variances.

Long-term Schedule

Nalcor is currently establishing new baselines for the Project schedule; therefore, as outlined in Table 8, the majority of the Milestone Dates have either been revised or are currently under review.

Table 8
Milestone Schedule

| Muskrat Falls Generating Facility | Planned Date March 2015 | Actual/Forecast August 2015 | Status |
|--|------------------------------------|--|---------------|
| Project Sanction | December 2012 | December 2012 | Complete |
| North Spur Works Ready for Diversion | September 2016 | September 2016 | Under review |
| River Diversion Complete | November 2016 | November 2016 | Under review |
| Reservoir Impoundment Complete | November 2017 | November 2017 | Under review |
| Powerhouse Unit 1 Commissioned - Ready for Operation | December 2017 | December 2017 | Under review |
| First Power from Muskrat Falls | December 2017 | December 2017 | Under review |
| Powerhouse Unit 2 Commissioned - Ready for Operation | February 2018 | February 2018 | Under review |
| Powerhouse Unit 3 Commissioned - Ready for Operation | April 2018 | April 2018 | Under review |
| Powerhouse Unit 4 Commissioned - Ready for Operation | May 2018 | May 2018 | Under review |
| Full Power from Muskrat Falls | May 2018 | May 2018 | Under review |
| Commissioning Complete - Commissioning Certificate Issued | June 2018 | June 2018 | Under review |
| Labrador-Island Transmission Link | Planned Date March 2015 | Actual/Forecast August 2015 | Status |
| Project Sanction | December 2012 | December 2012 | Complete |
| SOBI Cable Systems Ready | October 2016 | October 2016 | No change |
| MF Switchyard and Converter Station Ready for Operation | February 2017 | July 2017 | Revised |
| HVdc Transmission Line Construction Complete and Connected | June 2017 | July 2017 | Revised |
| Soldier's Pond Switchyard & Converter Stn. Ready for Operation | October 2017 | July 2017 | Revised |
| Ready for Power Transmission | October 2017 | September 2017 | Revised |
| Soldier's Pond Synchronous Condenser Ready for Operation | November 2017 | June 2017 | Revised |
| Commissioning Complete - Commissioning Certificate Issued | June 2018 | June 2018 | Under review |
| Labrador Transmission Assets | Planned Date March 2015 | Actual/Forecast August 2015 | Status |
| Project Sanction | December 2012 | December 2012 | Complete |
| Hvac Transmission Line Construction Complete | June 2016 | September 2016 | Revised |
| Churchill Falls Switchyard Ready to Energize | May 2017 | May 2017 | No change |
| Muskrat Falls Switchyard Ready to Energize | May 2017 | May 2017 | No change |
| Ready for Power Transmission | May 2017 | May 2017 | No change |
| Commissioning Complete - Commissioning Certificate Issued | June 2018 | June 2018 | Under review |

Project Risks

Given the size and complexity of the Project, it is important that any risks continue to be proactively identified and monitored and that mitigation measures are implemented as appropriate. The Committee continues to review Nalcor's monthly risk report and meets regularly with Nalcor officials to discuss major project risks and mitigation strategies.

Based on the Committee's review of the risk report for the period ending June 2015, the Committee focused on providing updates with respect to the following risks:

- 1. Risk of Project Schedule Delays**
- 2. Risk of Cost Escalation for Muskrat Falls Generation Facility**

1. Risk of Project Schedule Delays

Contractor performance in the Powerhouse & Intake remains a key area of focus for the contractor and Nalcor. While there has been significant improvement in concrete placement rates over the summer period and risk levels for certain areas – including the North Spur and River Diversion in 2016 – have decreased in the risk report since March 2015, the risk for schedule delays due to powerhouse concrete placement remains high and is receiving a great deal of attention.

River diversion in 2016 is a critical milestone and is directly related to the civil construction associated with the Muskrat Falls Generating Facility, more specifically with the work on the Spillway and Gates. The Committee notes that to avoid Project schedule delays significant production improvements in concrete placement and schedule performance will continue to be required in the short term, with those projected improvements consistently aligned with the established targets in the future. As previously referenced, the Milestone Dates relating to the Muskrat Falls Generating Facility remain under review at this time.

The Committee questioned Nalcor as to its assessment of risk for not achieving River Diversion in 2016. Nalcor responded that there are always risks associated with a project of this magnitude. The Nalcor Project Team is working diligently to manage the risks that it can directly control. As discussed in the previous section on the status of the Spillway and Gates, the River Diversion in 2016 is the next major activity on the Project Critical path. In order to achieve this event, work on the North Spur work must be complete, the Spillway concrete works and mechanical outfitting have to be advanced enough to control the gates and the river closure work must be progressed to cut off the natural flow path of the river. All of these activities are currently on target.

2. Risk of Cost Escalation for Muskrat Falls Generation Facility

Nalcor advises that the remaining cost risks for the Project are much reduced. As the Project has advanced and construction is well underway on all components, potential high risk activities which impacted project costs have been achieved and the Capital budget has been adjusted where required. All major contracts have been awarded or are through advanced evaluation which includes the majority of contract costs. The majority of materials have been ordered and costs are committed.

There is some remaining potential risk associated with the awarded contracts which have a reimbursable or time and material content and as well as risk for potential claims. The remaining project cost risks are associated with contractor performance, which can be impacted by many things and is a major part of the Nalcor project management team's attention. Other remaining risks include weather; geotechnical conditions; and commissioning, startup and integration.

Nalcor noted that the Contingency of \$186.8 million is designed to cover these potential risks and has been estimated in accordance with the low range advised by the Association for the Advancement of Cost Engineering International (AACEI) standard, as the following conditions have been met:

- The expected accuracy range for a project with a high percentage of definition with contracts placed;
- Engineering and purchasing complete; and
- Overall progress of the project over 50 per cent.

The AACEI standard for the hydropower industry states that the accuracy of the capital cost at this stage of a project is between -3 to +3 per cent. Nalcor has used 4 per cent on the remaining scope of the project. Nalcor advises that it sets aggressive contingency amounts in order to drive costs as low as possible.

The Committee notes that significant schedule pressures with respect to the Muskrat Falls Generating Facility remain. The performance of the civil contractor for the Muskrat Falls Generating Facility, while recently improved remains an ongoing area of focus given the schedule slippage already incurred. It will be critical for the civil contractor to sustain the production improvements to avoid further schedule slippage and may require additional efforts from certain Project contractors. This could impact costs beyond the Project execution risk contingency that has been established.

Other Oversight Activities

The Committee provides the following update with respect to additional oversight activities.

Independent Engineer

From March 13 to 16, 2015 the Independent Engineer accompanied Nalcor representatives on a factory visit to the Andritz facility in Chengdu, China where the turbines and generators are being manufactured. Based on the site visit the Independent Engineer concluded that the workmanship of the manufacturing work was very good and the most up-to-date technologies and tools were being used during the manufacturing process. The Independent Engineer also noted that in general good safety procedures were being observed during manufacturing.

Subsequently, on March 19, 2015 the Independent Engineer also accompanied Nalcor representatives on a site visit to the Nexans facility in Futtsu, Japan. The purpose of this visit was to verify the status of work and review the quality of processes for the manufacturing of the submarine cables for the Strait of Belle Isle cable crossing as well as the High-Voltage underground cables. The Independent Engineer found the manufacturing workmanship to be very good and observed that the manufacturing process thus far has been carried out in compliance with very high standards of safety, quality and environmental criteria. The Engineer also reported that the work under this contract appears to be on schedule.

The official reports on both site visits were released in August 2015 and can be found on the Committee's website at: www.gov.nl.ca/mfoversight/engineer/ or, on Nalcor's website at: <https://muskratfalls.nalcorenergy.com/newsroom/reports/>

The Independent Engineer also made a site visit to the Muskrat Falls site during July 6 to 9, 2015. Committee representatives accompanied the Independent Engineer on this site visit. The Independent Engineer's report on the site visit was issued to Nalcor on September 11, 2015. The report concludes:

“Overall, the project is managed and progressing well. However, fully meeting the current overall schedule for the powerhouse and intakes will be a significant challenge, not impossible, but likely not probable. The IE also notes that such scheduling challenges are typical for most large hydroelectric projects.”

Nalcor's External Auditor

On August 13, 2015 Nalcor released its 2015 Q2 Financial Report which included unaudited consolidated interim financial statements for the three and six months ended June 30, 2015 along with the associated Management Discussion and Analysis. Nalcor's Internal

Audit Committee has reviewed this report. The document can be found on Nalcor's website at:

<http://www.nalcorenergy.com/uploads/file/Nalcor%20Energy%202015%20Q2%20Financial%20Report.pdf>

The Report indicates that capital expenditures for the project for Q2 2015 were \$509.7M and \$830.1 million year-to-date. This represents an increase of \$231.6 million for the quarter and \$364.2 million year-to-date compared to the same period in 2014. The Q2 capital expenditures included \$199.7 million for Muskrat Falls Generating Facility, \$93.7 million for Labrador Transmission Assets and \$178.1 million for the Labrador-Island Transmission Link.

The unaudited financial statements also reported on capital costs incurred on the Maritime Link, which is owned and financed by a subsidiary of Emera Inc. Capital expenditures for the Maritime Link for Q2 2015 were \$94 million, bringing the total expenditure for that project to date to \$526 million.

Other Assurance Reviews

In fulfilling its mandate, throughout the construction period the Committee will examine issues such as whether management processes and controls are well designed and followed. The Committee provides the following update:

1. Project Controls for Cost and Schedule

As noted in previous Committee Reports, Ernst & Young, LLP (EY), in its role as consultant to the Committee, has been engaged to undertake a review of the Project Controls for Cost and Schedule. EY has completed execution of this work and has provided a draft report to the Committee. A copy of the report has been shared with Nalcor for final validation. The Committee will post the EY report to the Committee website once finalized.

Next Report

The Committee will continue its oversight of the construction of the Project in accordance with its mandate and the Oversight Framework.

Appendix A

Project Budget Summary Expenditure Categories

The summary expenditure categories are described as follows:

NE-LCP Owners Team, Admin and EPCM Services: includes the labor, facilities and overhead costs of the LCP Project team as well as costs of SNC Lavalin.

Feasibility Engineering: includes the cost of early stage engineering activities which are now complete.

Environmental & Regulatory Compliance: includes costs associated with environmental assessment, permits, licenses and similar such costs.

Aboriginal Affairs: includes costs associated with activities in the aboriginal communities along with obligations under the Impact and Benefits Agreement.

Procurement & Construction: includes costs associated with the major construction activities and the award of contracts.

Commercial & Legal: includes costs associated with insurance, legal and other commercial activities.

Contingency: provision for additional expenditure, if required.